Telecine STE-B1

SHADOW



Customer‘s Manual

THOMSON MULTI MEDIA
BROADCAST SOLUTIONS

Published by

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Planning & Installation

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THOMSON MULTI MEDIA
BROADCAST SOLUTIONS

Revision Report

SHADOW **Telecine STE-B1** **Customer's Manual**

Documentation Order Number FU 0065, 000 126 626 500

Before reading the entire manual, please check for any supplements at the end of the manual.

Item	Rev	Date	Serial No	Pages affected	Volume/Contents	Remarks
1	0	12.1999	100	all sections	Planning and Install. Operating Instructions	1st Edition Preliminary (Beta Test)
2	1	05.2000	100	all sections	Planning and Install. Operating Instructions	Shipment release
3	2	04.2002	100	all sections	Planning and Install. Operating Instructions Plus: Customer's Manual Graphical Control Panel	2nd Revision Operating Software V2.47 Operating Software V1.7.10

SAFETY INSTRUCTIONS



Caution!
These servicing instructions are for use by qualified personnel only.
To reduce the risk of electric shock, do not perform any installation other than that contained in the Planning and Installation Manual unless you are qualified to do so. Refer all servicing to qualified service personnel.



Attention!
The film scanner unit has to be unpacked and lifted up by authorized forwarding agencies only, with appropriate lifting tool under control and instruction of Thomson service personnel!
Danger of injury when the film scanner being lifted to the upright position!



Danger of fire!
Mount the Shadow Telecine STE-B1 on concrete or other non combustible surface only.

Application

The **Shadow Telecine STE-B1** is designed for application in TV studios and production facilities only. For safety reasons, any application for purposes other than the original intended is not allowed.

CLASS 1
LASER PRODUCT
Eye safe

Product complies with DHHS Rule 21 CFR Subchapter J in effect at date of manufacture

Safety instructions concerning **FH 6335** Serial HiPPI Interface (Rack 3):
The laser transceiver, used in this unit, is classified as AEL Class 1 (U.S. 21 CFR(J) and /AEL Class 1 per EN 60825-1 (+A11) and is eye safe.

LISTED
PROFESSIONAL VIDEO EQUIPMENT
3S13

The **Shadow Telecine STE-B1** is designed accordingly to regulations of the Underwriters Laboratories Inc. ® Northbrook, Illinois US, certificated and registered under file no. E184475

Conform with the following European directives and CE marked:

Low voltage directive	73/23/EEC
Safety standard	EN 60950 / 1997
EMC/EMI	89/336/EEC
Interference emission	EN 55103-1 / 1996
Interference immunity	EN 55103-2 / 1996

N4067

EMC	AS/NZS 3548
FCC	FCC 47 Part 15 Class A

FCC Rules 47 Part 15 Sec 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Nitrate film material



The Shadow Telecine is not designed for running nitrate film material.
Thomson is not responsible for possible damage to the film material as well as for any subsequent damage resulting therefrom.
Nitrate-base film material can be destroyed through electrostatic effects or when the internal heat filter is damaged.

Risk of injury

When the Telecine is running, always keep the front doors closed, do not touch the rotating film deck parts.
The closed front doors protect against fluttering film ends in the event of a film break.

Access to the inside

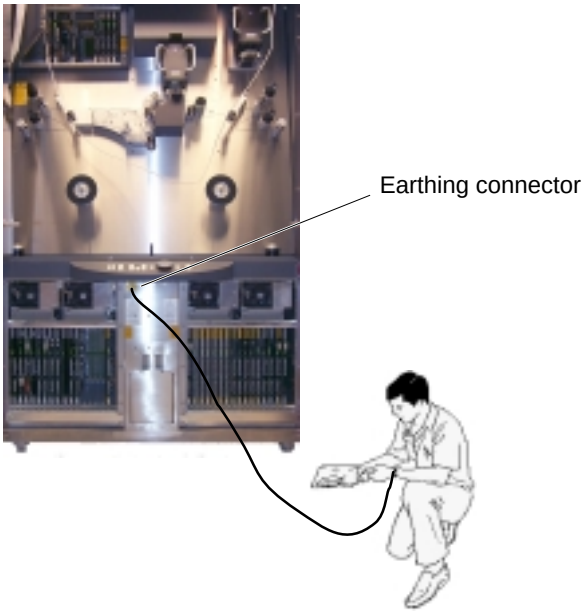
Access to the inside of the **Shadow Telecine STE-B1** is restricted by locked front and rear doors. The closed doors protect operator against electrical and mechanical hazards.
Before working on the power supply circuit (power clips, wires, filters, switches, fuses etc.) disconnect the unit from mains. Even if the mains switch is ”OFF”, parts of the unit are still alive!
If, however, working on the opened machine is inevitable, this has only to be done by an expert who is familiar with the dangers involved.



Caution!

Capacitors may still carry a residual charge for 4 minutes after having switched off the unit!

Attention!
Electrostatic sensitive devices on the p.c. board. Observe the following precaution instructions for handling:



- Never remove or insert p.c. boards when the Telecine is switched on.
- Install or remove p.c. boards from the Shadow Telecine with the corresponding equipment only. Prior to withdrawing the p.c. board from the bag, apply an earthed wristlet (e.g. 3M Wristlet Serial 2200).
- The Shadow Telecine cabinet is provided with a special earth connector at the front and rear side.
- Use antistatical protective bags when carrying the p.c. boards.

Safety Regulations EN / VDE

The **Shadow Telecine STE-B1** is designed in conformity with the safety regulations EN 60590 / VDE 0805 (protection class 1) and is in a faultless condition when leaving the factory. In order to maintain this condition and to ensure a safe operation, the following directions have to be observed:

When setting up and connecting the **Shadow Telecine STE-B1**, connect the earth line **always** before connecting the power line. Thus is ensured that in case of a short-circuit between mains and case, the current is led to earth.
For this reason, **never** disconnect the earth line from the device while it is connected to mains. Details see chapter 4.13.3 “Earthing Requirements” in the Customer Manual Planning and Installation.

Fuses

The **Shadow Telecine STE-B1** is protected by primary-side fuses located on the power terminal unit.

Caution!
To reduce the risk of fire replace only with the same type and rating of fuse. Never use a mended fuse! Do not short-circuit the fuse holder!



Caution!
The rear service AC Out socket is a double-pole or neutral fusing.
After operation of the protective device, one line can remain under voltage!

Mains voltage

The **Shadow Telecine STE-B1** is set to operate at the mains voltage stated on the lable on the machine rear.

Prior the installation of the machine, make sure that the mains voltage in the studio is identical to the voltage stated on this label. Details see chapter 4.13 Mains connection" in the Customer Manual Planning and Installation.

Ventilation

The **Shadow Telecine STE-B1** is cooled by a ventilation system. The ventilating air stream enters through openings in the bottom frame of the cabinets. The outgoing air leaves the cabinets on top. For this reason, make sure that the air inlets are not covered when setting up and that sufficient space is maintained to the other units. For cooling reasons always keep the doors closed during operation.
The admissible ambient temperature of the Telecine must not exceed or fall below the range of +10^{o} C (50^{o} F) and +35^{o} C (95^{o} F).
Optimum operation is at temperature of +20 ^{o} C.

Make sure that the machine is protected against high humidity!

Make sure that enough space is provided so that the cabinets are easily accessible for operation and service works.

During operation

Operate the **Shadow Telecine STE-B1** in closed condition only.

To avoid EMC (electromagnetic compatibility) problems keep the lower front and rear doors always closed during operation!

Opening the covers or removing parts with tools may give access to live parts. In such cases, the machine has to be disconnected from the mains.

If, for example due to a failure, safe operation of the **Shadow Telecine STE-B1** is no longer ensured, take the machine out of operation and secure it against further use.

Service



Attention!
Do not insert or remove plug-in cards during power on.

Ptojection Lamp



Attention:

Switch off the Shadow telecine before cleaning the light path, and allow it to cool down for 30 minutes (risk of getting burnt in the proximity of the halogen projection lamp!).

Touch Screen of GCP



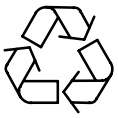
Do not use pointed, sharp edged or metallic implements as a stylus, they may damage the sensitive touch screen!
Use only the Thomson stylus, order no. 1 128 651 046.

Batteries

The device contains lithium batteries, which has to be exchanged every five years. Detailed information you can find in the section *Change the backup battery* in the operating instructions.



Caution!
Danger of explosion if battery is incorrectly replaced (interchanged poles).
Replace only with the same or equivalent type recommended by the manufacturer.
Dispose used batteries according to the manufacturers instructions.



Protect the environment!

Dead batteries do not belong in the garbage. Hand the used batteries over to a local disposal place!

Connection cables

The EMC regulations are only applicable when correctly shielded cables are used for installation of the equipment. This applies to video cables as well as control cables. Corresponding cables can be obtained from Thomson.
Run all connection cables in covered cable ducts (risk of stumbling).

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1. GENERAL

1.1 ABOUT THIS MANUAL

This manual is part 1 of the **Shadow STE-B1** Customer's Manual.

This part of the manual contains all information required by the planning engineers in the preparation of installation to include the Shadow Telecine in a studio or production environment. Furthermore, it contains all information required for setup, installation and initial startup.

All further information concerning control, maintenance and repair you will find in the Operating Instructions and the Service Manual (in preparation) of the system.

1.2 INTRODUCTION

The **Shadow Telecine** is a professional digital multi standard telecine, based on highly sophisticated CCD film scanning technology, for reproduction of color and black/white films of the most different formats in highest picture quality.



Fig. 101: Shadow Telecine STE-B1

The operating software serves to set the video parameters by means of the primary color correction in extended ranges. The Shadow Telecine is prepared for various useful options like **Rotation**, **HDTV Output, Data Output via Phantom Transfer Engine, 6/8 perf film mode Vistavision, S8 mm film scanning** and a **6-Sector Color Correction**. These features make the telecine predestined for high end post productions.

Extended flexibility provided by the options mentioned above gives the telecine a lead in telecine technology.

1.3 CONFORMITY





E184475

This Shadow Telecine STE-B1 (three-phases 120/208V AC Power version) is designed accordingly to regulations of the Underwriters Laboratories Inc. ® Northbrook, Illinois US, certificated in Nov. 1999 and registered as file no. E184475.

The STE-B1 telecine, operating on the mains voltage 120/208V AC, is constructed in conformity with the American and Canadian UL standards and is marked with an UL sign on its type label.



Conform with the following European directives and CE marked:

Low voltage directive	73/23/EEC
Safety standard	EN 60950 / 1997
EMC/EMI	89/336/EEC
Interference emission	EN 55 103-1 / 1996
Interference immunity	EN 55 103-2 / 1996



EMC	AS/NZS 3548
FCC	FCC 47 Part 15 Class A

1.4 FEATURES AND SPECIAL CHARACTERISTICS

Principle of film scanning

A prism assembly splits up the line of the light scanning film onto the respective color filters of the R, G and B line CCD sensor.
The impinging light is optoelectrically converted in pixel elements of the CCD line sensor depending on the line content, then transferred in parallel to the analog CCD shift register and read out horizontally.

Output standards

The Shadow Telecine provides for reproduction of films in the 625/50 and 525/59.94 (4:3 / 16:9) SDTV standards and – as optional feature – in the various HDTV and DTV standards (1280x720 / 1920x1080 - interlaced 2:1, progressive 1:1, segmented frame) or in DPX film data format. EDTV standards are prepared.
Standard selection is made in the main menu ”SETUP.”

Film types

COLOR PRINT (B/W positive, B/W negative, color positive), **COLOR NEGATIVE**, **INTERMEDIATE*** and **PRIMETIME** films of all formats can be reproduced, which have 1 (16 mm) 2, 3, 4 (35 mm) perforation holes per frame.

***** Intermediate film: a normal positive film with an orange colored mask, which is also used in negative films.

The option “Vistavision” provides reproduction of 6 and 8 perf 35mm films.

Note: Option Rotation is required.

Film formats

The telecine operates with S8 (option) 16 mm, Super 16mm, Academy 35mm and Full Aperture -35 mm film formats. A simple switch over enables 4:3 as well as 16:9 reproduction.

Format change

Format change from 35 mm to other film formats without the need of adjustments, simply by menu selection and exchanging the lens gate assembly.

Lens gate assemblies

The Shadow Telecine can be equipped with the following lens gate assemblies (also called LGA’s):

- Super 16mm lens gate assembly incl. 16 mm film gate for scanning super 16 mm and 16 mm films
- FA 35mm lens gate assembly (Full Aperture) incl. 35 mm film gate for scanning super 35 mm and 35 mm films

Effect filters

Special effect filters can be positioned into the Lens Gate Assembly.

Gateblast unit

An integrated gateblast unit, consisting of a pressure reducer, air filter and magnetic valve keeps the light gap of the film gate dustfree.
An external air compressor (approx. 2.5 - 7.5 bar or 35 -107 lb / sq. inch - air volume: 60 l / min. / oilfree operating) is required.



Attention!
The using of the gate blast unit is absolutely mandatory to keep the film gate with illumination slit and integration cylinder clean from dust.

Sizing

The fully digitized sizing facility allows a distortion-free reproduction of different film formats. Broadcast quality picture section enlargements and reductions are possible via the sizing adjustments.

Primary color correction

Via stored matrix and mask settings, all positive, negative and interpositive films are adapted to the telecine.

Color correction adjustments can be carried out individually or together in the black, gray and white picture areas.

The chrominance saturation compensates color losses of the film being scanned.

Secondary color correction

The Shadow is prepared for the option “6-Sector Color Correction”.

Aperture, 2D contour correction

The horizontal and vertical contour and aperture enhancement of the telecine provides optimum sharpness.
The aperture correction is fixed with a flat response.
The contour correction is variable to increase or decrease sharpness.

Film reels or winding plates

The film capacity of winding plates (Ø = 44 cm) amounts to 900 m and of film reels (Ø = 54 cm) to 1200 m. In addition, film loop operation is possible.

Film transport

The film transport is continuously. The silent capstan drive is microcomputer-controlled and ensures gentle film handling.

Film transport modes

There are **two unlocked modes** of film transport in forwards and reverse motion:

1. Single frame mode

2. Continuously adjustable search mode
with visible picture and full color picture size)
from slow motion (= 1/10 the normal speed)
up to 10x of the normal speed for 35mm film
up to 25x of the normal speed for 16mm film

Locked modes

Normal speeds are:

24 frames/s	for 60 Hz TV standards
25 frames/s	for 50 Hz TV standards

Fixed film transport speeds (forward and reverse):
with 50 Hz standard: 6 $^{1}/_{4}$, 12 $^{1}/_{2}$, 18 $^{3}/_{4}$ 25 and 50 fps
and with 60 Hz standard: 6, 12, 18, 24, 30 and 48 fps

Variable SAS (select a speed) film transport speeds forward and reverse: are from 2 to 57 fps in steps of 1/1000 fps.

In addition, quick stop and a high-grade freeze frame are standard.

Auto functions

The Shadow telecine has an **automatic quick stop mode** that responds to film break and film run out.
The **FPN (Fixed Pattern Noise) correction**: includes the automatic shading compensation, the automatic white balance and the coarse POS/NEG matching.

Analog video interface

Analog R G B or Y C_B C_R standard video interface (SDTV Output FY 6312) enables connection to conventional video equipment.

Digital video interface

The digital video interface (SDTV Output FY 6312) provides SDTV 4:2:2 output signals conforming to EBU Tech. 3267-E and SMPTE 125 M interface format and to the CCIR 601 and CCIR 656 standards.

- Digital Outputs: - SDTV 4:2:2, 4:2:2:4 or 4x4 Parallel
  - SDTV 4:2:2, 4:2:2:4 or 4x4 Serial

Distribution of EDTV and 8:4:4 signals via this interface is prepared.

Sepmag Control Interface

This interface can be used to drive external SEPMAG units (e.g. Killi, Albrecht, Sondor, Perfectone a.o.) lip-synchronously to the associated film.
Two bi-phase sync pulses determine the direction of tape motion of the external SEPMAG unit.
These pulses are configurable to 1x (25/24 Hz) 2x (50/48 Hz) or 10x (250/240 Hz) film speed.

Time code system

The telecine enables a clear identification of every frame at every PLAY speed. Linear Time Code compatible to SMPTE standard 12M is provided at socket LTC OUT Rack3.

Key code reader systems

The Shadow Telecine STE-B1 provides the use of AATON, Evertz and ARRI keycode reader heads.

Note!
Reader heads are not included.

Key code embedded in DPX data

The operating software applies to keycode data reproduction generated by a keycode reader from the manufacturers Evertz, AATON or ARRI.

Local Control system

The Shadow telecine is supplied with a Local Control Panel which provides basic operation of transport, framing, FPN, stand by, focus and local / remote functions. The Functional Control Panel provides complete functional control of the telecine, incl. setups. This panel controls the machine via the internal iMCS 1 interface.

Remote control interfaces

The remote control interface **iMCS 1** serves also to remotely control the telecine from external devices (e.g. Pogle Pandora, DaVinci Renaissance).

IMCS control interface:

The iMCS control interface (internal machine communication system) is designed as a control connection between machine(s) and control panel(s) on Cheapernet basis (IEEE 802.3 standard).

iMCS: 10Base-T / RJ45 connectors with internal HUB
IEEE 802.3
For Graphical Control Panel, Film Color Correctors and Diagnostic PC with cheapernet interface board.

WF-monitoring

A monitoring selector allows to display a signal at several test points within the digital processing chain, for enhanced monitoring session and for test purposes.

Note!
Not included but required: Waveform monitor

PTR rollers

The Particle Transfer Rollers used to clean the film during play on both sides of dirt, dust and lint.
The rollers are performed as reverse helix particle transfer rollers. That means they contain a *Micro Mat* helix side-wipe system for a powerful film cleaning.

1.4.1 GCP 1 GRAPHICAL CONTROL PANEL

The control panel GCP1 designed as graphical user interface allows all operational functions to be controlled.

1.4.2 LENS GATE ASSEMBLY AND GATE BLOCK OPTIONS

- **FA35 LGA - Full Aperture 35 mm Lens Gate Assembly**
  For scanning all types of 35 mm POS, NEG, IP and Primetime films.

  Comprising:
  - Film gate
  - Image Lens
  - Test film: Chess Board

- **FG S16 LGA - Super 16 mm Lens Gate Assembly**
  For scanning all types of 16 mm POS, NEG, IP and Primetime films.

  Comprising:
  - Film gate
  - Image Lens
  - Test film: Chess Board

- **FH 4602 Super 8 mm Film Gate (Option) for FG S16 LGA**
  For scanning all types of S8 mm films. In exchange with 16 mm film gate, which is part of the FG S16 LGA.

1.4.3 AUDIO OPTIONS

Audio formats

All usual audio tracks can be scanned

- 16 and 35mm comopt sound (COMOPT/mono)
- 16mm commag sound (COMMAG/mono)
- 35mm comopt sound (COMOPT/Dolby stereo, switchable to mono)

Test generator

Internal test tone generator (1kHz/10kHz)

Analog audio interface

The analog audio interface of the telecine enables connection of mono or stereo signals to conventional audio studios.

Analog outputs:
- Audio 1 / 2
- Monitor L / R
- Headphone

Digital audio interface

The digital audio interface conforms to the AES/EBU standard.
The sound can be digitally delayed from the control panel.

Digital Output AES / EBU

- **FH 1129 - Audio Scanner & Processor**

  Including:
  - Audio Scanner 1 (Commag 16 mm / Mono)
  - Audio Scanner 2 (Comopt 35 / 16)
  - Audio Equalizer & Processor Boards
    Mounting into Rack 1 and Filmdeck

- **FY 1102 - Audio Output Transformer**
  For symmetrical and ground free **analog** outputs; galvanic isolated.

1.4.4 FH 4067 - IMAGE ROTATION OPTION / FH 4068 IMAGE ROTATION UPGRADE KIT

Allows to rotate the picture in a range of – 180^{o} to + 180^{o}

Including:

- FY 6301 Spatial Control & Address Generator
- FY 6302 Effect Spatial Processing 3x

Mounting in Rack 3

Note: Required for option “Vistavision”

1.4.5 FH 4069 - HDTV OUTPUT OPTION

The HDTV Output Option contains the p.c. boards
HDTV Output Digital FY 4313.xx and HDTV Output Analog FY 6314.xx and two HDTV Serializer.

Allows to select the following HDTV standards:

- 1250/50 / 2:1 according to CCIR TG 11 or EU 95
- 1125/60 and 1125/59.94 / 2:1 according to SMPTE 260M
- 1920x1080/60 and 59.94 / 2:1 according to SMPTE 274M

Spatially upconverted from 1332 pixel optical resolution.

Analog RGB or $YC_R C_B$ (BNC) and
digital parallel CCIR TG 11 (2x 50-pin subminiature D-connector) interface.

Containing boards for:

- Multi standard HD D/A converter (1x)
- HDTV digital output stage (1x)

1.4.6 FH 4066 - DIGITAL TV OPTION

The Option DTV, operating in the Shadow Telecine STE-B1, is designed to generate film images according to the digital TV standards ANSI / SMPTE 296 M.

- 1280x720 / 60 Hz progressive
- 1280x720 / 59.94 Hz progressive
- 1920x1080 / 25 Hz progressive
- 1920x1080 / 24 Hz progressive
- 1920x1080 / 23.98 Hz progressive
- 1920x1080 / 24 Hz segmented frames
- 1920x1080 / 23.98 Hz segmented frames
- 1920x1080 / 50 Hz 2:1 interlace

Note! ***Option FH 4069 HDTV Output is required.***

1.4.7 TE 4101 - PHANTOM TRANSFER ENGINE PACKAGE 103, 0 128 407 010 (OPTION)

consisting of:

-	DS 0170	Phantom TransferEngine SW (CD)	0 038 057 000
-	FY 4345.xx	Data Output Interface (Rack 3)	0 128 434 570
-	FH 6335	HiPPI Serial Interface (Term.Panel R 3)	0 128 633 500
-	FU 0077	Customer‘s Manual Phantom TE	0 126 627 700

Introduction

The Phantom TransferEngine is a complementary product to the **Spirit** DataCine film scanner, **Shadow** Telecine and the **Specter** Virtual DataCine, and includes integrated software applications and drivers developed to ensure efficient control and maximum image data throughput during the scanning process.

The Phantom TransferEngine captures image data either from the HiPPI data channel or from the HDTV channel:

- The HiPPI data channel can record DPX–formatted images from the Spirit DataCine, Shadow Telecine and Specter Virtual DataCine HiPPI data output.
- The HDTV channel can read HDTV video from Spirit DataCine, Shadow Telecine, Specter Virtual DataCine and VooDoo Media Recorder. This feature is supported by a Phantom TransferEngine running on a Specter Virtual DataCine only and requires appropriate optional hardware installed in the SGI server.

The transferred image data can be displayed in various resolutions on the monitor, stored onto a disk array with or without prior modification (e.g. change of format, etc.) and written to tape for archive purposes.

Features

- Accepts data from Spirit DataCine, Shadow Telecine and Specter Virtual DataCine HiPPI output
- Accepts video from the Spirit DataCine, Shadow Telecine, Specter Virtual DataCine and VooDoo Media Recorder HDTV output
- Stores data on disk in DPX format (SMPTE 268M–1994)
- Displays Thumbnail pictures for confidence viewing
- Displays HiRes images on Data Monitor
- Remote control by Telecine Controller supported
- Data format export (Cineon, SGI, TIFF, JPEG, BMP, etc.)
- Graphical User Interface (GUI)
- Drivers for archiving devices

1.4.8 6SC - 6 SECTOR COLOR PROCESSOR

Basic 6 sector color corrector for yellow, green, cyan, blue and magenta. It extends the primary color corrector already supplied with Thomson telecine and works always in the highest possible resolution of the scanning system.

1.4.9 FH 1639 - VISTAVISION

Extends the 35mm scanning formats by
- 35mm 8 perf (Vistavision) film format
- 35mm 6 perf (Cinerama) film format

Note! ***Option FH 4067 Image Rotation is required.***

1.4.10 SGR 2000 - SCREAM GRAIN REDUCER

Resolution independent Grain Reducer contains a signal processing in RGB up to 2k in real time, use of the internal real time bus interface of Shadow and controlled by the GCP or a TK controller.

Note! ***Option FH 4067 Image Rotation is required.***

1.4.11 FH 4602 S8 MM FILM SCANNING

See chapter 1.4.2 lens gate assembly and film gate options.

1.4.12 ACCESSORIES

- **FH 4020 Basic Accessories 0 128 402 000**
  Contents:
  Toolbag with various standard and special tools, 10 pcs capstan lamp
  Dustaway compressed air cleaner

- **Customer‘s Manual FU 0065**
  (already supplied with the basic unit)
  incl.:
  Part 1: Planning & Installation
  Part 2: Operation Manual

- **FH 1660 Diagnostic Kit**

  Provides comprehensive diagnostic, service presets and remote access control of the Shadow Telecine via modem and software PC DUO.

  Comprising:
  - PC Software SDCMAINT DS 0153
  - PC DUO software FH 1661 for remote access control
  - PC LAN connection cable 10m FH 1667

  Features:

  - STE-B1 option control (views and enables additional software options)
  - iMCS protocol recording and editing
  - System messages recording, editing and weighting selection
  - Software and board version indication
  - Operating time for the Telecine, projection, capstan and audio lamps
  - Continuous realtime board check for correct type, version, sync pulses, RSCI control over temperature
  - Store, analyze and reload system dumps
  - Mini control panel
  - Interactive system tests via script files
  - Remote control access for Thomson service

Hardware Requirements for SDCMAINT:

- Desktop PC with a CPU i486, Intel Pentium or compatible using Windows 3.x, 95, 98, NT, 2000, ME, XP
- 3 ½" floppy disk drive
- CD ROM drive
- VGA graphics adapter with a minimum of 640x480 pixels and 16 colors (recommended are 800x600 or 1024x768 pixels and 256 colors)
- 8 MB RAM
- Ethernet card (ISA, PCI, PCMCIA or Pocket Adapter) with a BNC connector (10base2) or 10Base-T / RJ45 connector.
- Modem for remote control access with PC DUO

1.4.13 OPTIONAL ACCESSORIES

- **Air Exhaust Hood 2 128 500 010 (Option)**
  Exhaust hood with flanges for two 10 inches air hoses.

- **FH 4425 Spare Lamp Socket 0 128 442 510 (Option)**
  Socket for halogen lamp

- **Service Manual FU 0066**
  Comprehensive technical manual

- **Test films**

35mm:

– TF 35-F4 FA 35mm test film, format, 4perf	1 015 630 067
– Checkerboard test 35mm (3 m)	1 131 900 332
– Grating test 35mm (3 m)	1 131 900 333
– Format film 35mm anamorphic (3 m)	2 015 630 056
– Format film 35mm academy (3 m)	2 015 630 054
– 5MHz focus distribution 35mm	2 131 900 163
– Dolby stereo COMOPT audio, with pink noise 35mm	1 011 010 082
– Dolby stereo COMOPT audio, signal level 35mm	1 011 010 083

Super 35mm:

– TF 35-HR FA 35mm test film, HDTV resolution	1 015 630 070
– TF 35-F3 FA 35mm test film, format, 3perf	1 015 630 071
– TF 35-F2 FA 35mm test film, format, 2perf	1 015 630 072

16mm:

– Checkerboard test 16mm (2.8 m)	1 131 900 336
– Grating test 16mm (2.8 m)	1 131 900 337
– Format film 16mm (3 m)	2 015 630 051
– Format film 16mm anamorphic (3 m)	2 015 630 053

Super 16mm:

– TF 16-FS S 16mm test film, format	1 015 630 073
– TF 16-HR S 16mm test film, HDTV resolution	1 015 630 068

1.4.14 CONSUMABLES

- **Halogen Lamp 2 128 102 130**
  Spare halogen lamp 250 W / 24 V (10 pcs) for film illumination

- **Spare PTR roller set – 3 149 900 882**
  contains 4 rollers

1.4.15 FH 4032 - ONE PHASE POWER TERMINAL UNIT

Alternative to the standard Three Phase Power Terminal FH 4030
Only for 230 V!

Can only be ordered with the initial order of the STE-B1!

1.4.16 FH 4033 - TWO PHASE POWER TERMINAL UNIT

Alternative to the standard Three Phase Power Terminal FH 4030
Only for 208 V!

Can only be ordered with the initial order of the STE-B1!

1.5 OVERVIEW

1.5.1 Operational Units

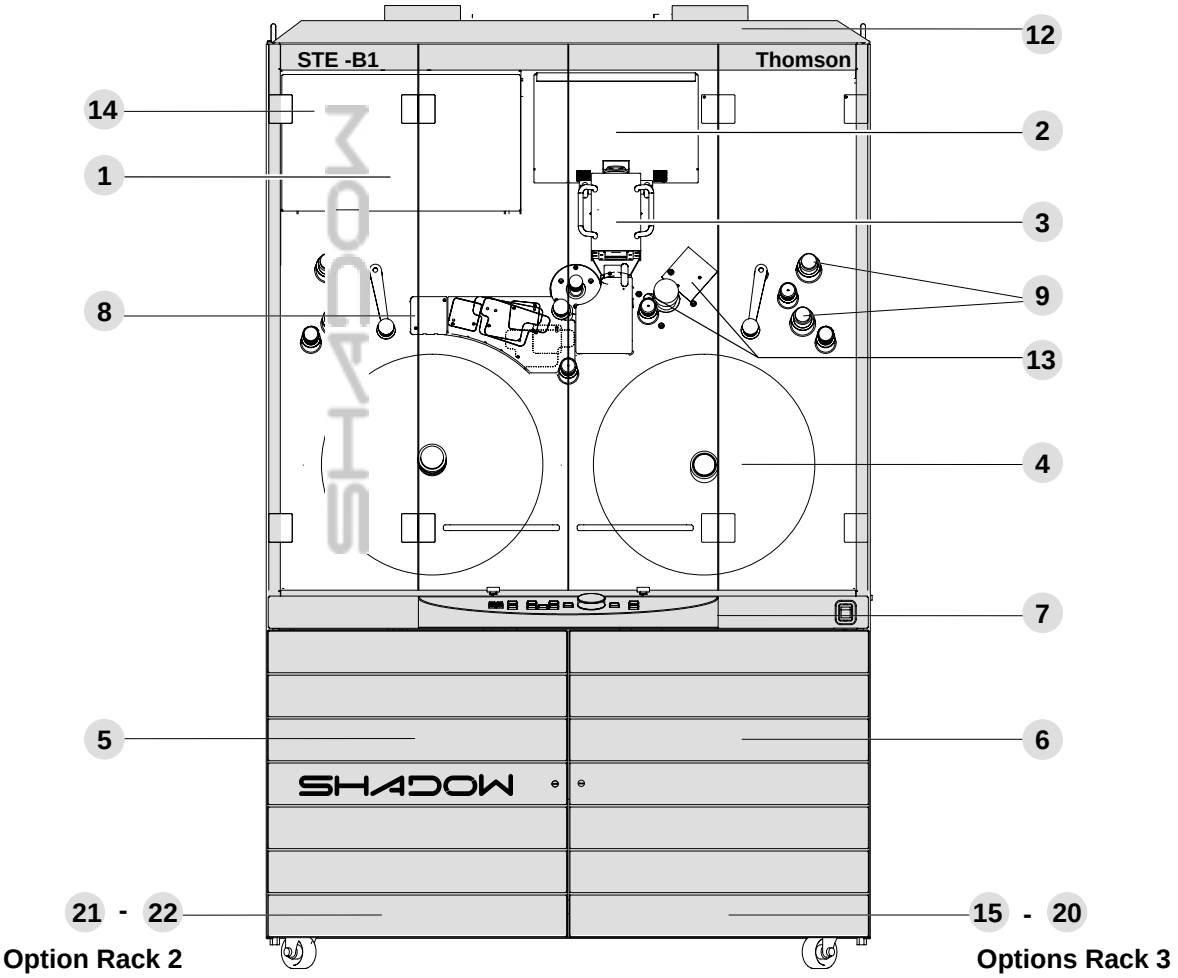


Fig. 102: Main modules and optional units in the Shadow Telecine STE-B1

The Shadow Telecine consists of the following main modules:

1. Film Preprocessing FH 4100 and optional Audio Processing (**Rack 1**)
2. Film Scanner FH 4400
3. Lens Gate Assembly (35 mm or 16 mm LGA)
4. Filmdeck FH 4000
5. Film Processing FH 4200 (**Rack 2**)

6. Film Postprocessing FH 6380 (**Rack 3**)
   including:

SDTV Analog Out	R G B S K	or Y C_R C_B S K	
SDTV Digital Out	4:2:2	or 4:2:2:4	or 4x4

7. Local Control Panel

8. Keycode Reader Mounting Support
   for AATON, EVERTZ and ARRI

9. Particle Transfer Rollers

10. Diagnosis Kit FH 1660 (see fig .103)
    Diagnosis & maintenance tool “SDCMAINT” incl. remote access control via PC DUO.
    Not included but required: PC with Ethernet Interface and modem.
    Hardware requirements for PC and Ethernet card see separate manual SDCMAINT.

11. GCP1 Graphical Control Panel
    See fig. 103.

Options

The following units are optionally available:

12. Air Exhaust Hood

13. Audio Pick-up and Processor Set FH 1129
    mounted on the filmdeck

    - Audio Scanner 1 FH 1013 (Commag 16) and
    - Audio Scanner 2 FH 1023 (Comopt 35 / 16 mm)

    and with following boards in rack1

    - Audio Equalizer Board FY 1101
    - Audio Processor FY 1103

14. Audio Output Transformer FY 1102

15. HDTV Processing FH 4069
    including following boards in rack 3:

FY 6314.xx HDTV Output Analog	G B R S K or Y C_B C_R S K
FY 4313.xx HDTV Output Digital	4:2:2 or 4:2:2:4 or 4x4

16. FY 4345.xx Data Output Interface board in rack 3
    Part of FH 4101 Transfer Engine Package

17. FH 6335 HIPPI Serial Interface board in rack 3
    provides a high speed data transmission via fibre optic cable
    Part of FH 4101 Transfer Engine Package

18. Rotation FH 4067
    including following boards in rack 3:
    FY 6301.xx Spatial Controller and Address
    3x FY 6302.xx Effect Spatial Processor

19. Digital TV FH 4066
    including following boards in rack 3:
    FY 6338.xx Genlock 1920x1080/P

20. Transfer Engine Package TE 4101
    including the board FY 4345.xx Data Output Interface in rack 3,
    the HiPPI Serial Interface for data transmission via fibre optic cable
    and Transfer Engine software for high-speed film data to be fed to a computer workstation.

21. 6 Sector Color Processor (6SC STE)
    including following board in rack 2:
    - FY 4209.xx Secondary Color Correction

22. S8 mm scanning
    including following board in rack 2:
    - FY 6262.xx Capstan Control and Sprocket Pulse Generator

For Shadow Telecine system configuration, the following units are recommendable:

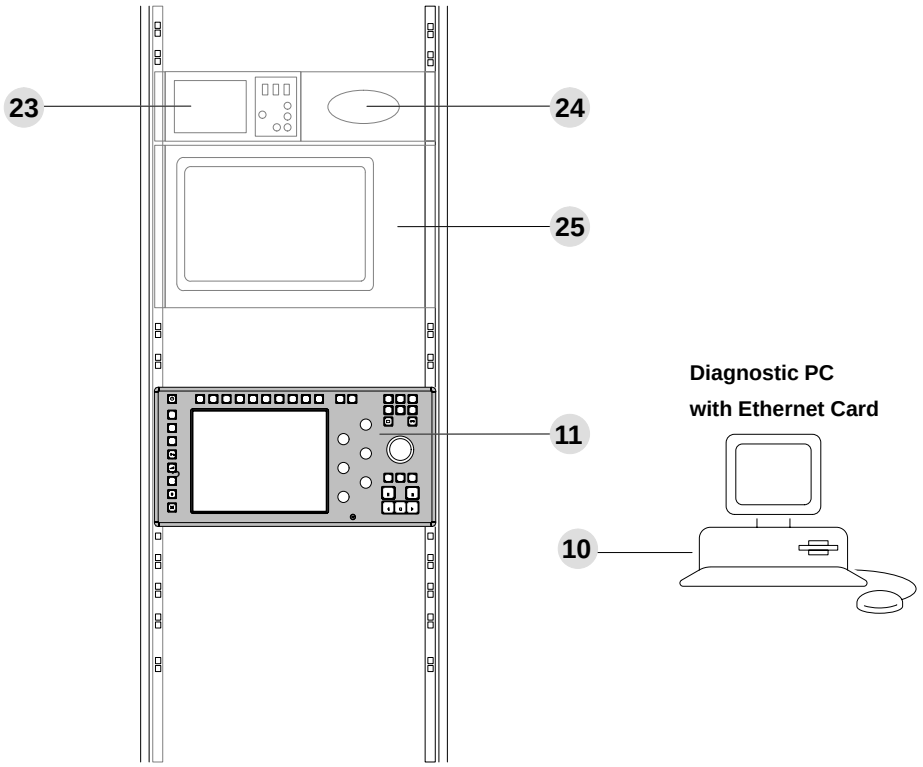


Fig. 103:

23. Waveform monitor - multistandard (e.g. Philips PT 5464 HD)

24. Active audio speaker (e.g. Fostex 6301B)

25. Video color monitor (e.g. Sony 2010 / SDTV or Barco HDM 2051/HDTV)

2. SPECIFICATIONS

Note! Specifications apply after a warm-up time period of 15 minutes.

2.1 GENERAL

2.1.1 DEVICE CATEGORY

The Shadow Telecine is suitable for stationary studio operation.

2.1.2 ENVIRONMENT

Recommended	Air-conditioned or ventilated; dust-free room		
Temperature	**Operation:**		+10°C to 35°C (50°F to 95°F)
	Storage:	with Lens Gate Assy	+10°C to 40°C (50°F to 104°F)
		without Lens Gate Assy	-10°C to 40°C (14°F to 104°F)
	Specifications apply after a warm-up period of 15 minutes		
Rel. Humidity	Storage and operation without condensation		10% to 80%
	Specifications apply to a range of		40% to 60%
Ventilation	The ventilating air stream enters through openings in the bottom frame of the Shadow Telecine cabinet. The outgoing air leaves the cabinet on top.		
	Air filter mats protect against dust.		
Required air quantity	At 20° C ingoing air temperature		900 m^3/h (32 000 f^3/h)
Safety regulations	Electrical equipment		
CE	• Low voltage directives		73/23/EEC
	Safety of information technology equipment		EN 60950 (VDE 805) (IEC 950)
	• Mechanical equipment		DIN 31000
c UL us E184475	• Standard for safety		UL 1419

Electromagnetic compatibility (EMC)

Interference emission	Electromagnetic environment E2 and E4	EN 55 103-1
CE		
	Electromagnetic emission:	
	– emission radiated	EN 550 22 class B
	– emission contacted	EN 550 22 class B
Interference immunity	Electromagnetic environment E2 and E4	EN 55 103-2
CE		
	– Electromagnetic immunity	EN 61000-4-3
	– Electrostatic discharge	EN 61000-4-2
	– Electrical fast transient (burst)	EN 61000-4-4
	– Surge immunity test	EN 61000-4-5
	– Immunity to conducted disturbances	EN 61000-4-6
	– Voltage dips	EN 61000-4–11

Comment:
According to the valuation criterion B, test pulses in conformity with standard EN 55 103-2 may cause minor picture interferences at the analog SDTV output. In addition, disturbances in synchronism may occur at the outputs Sync Out (J37), SDTV Sync Out (J 40), Pulldown Out (J17) and FRS Out (J18). After decay of test pulses, there will be no impairment of operation.

Attention!
Conformity to the EMC regulations is only assured with closed Shadow Telecine rear doors during operation.

N4067 Australian C-Tick-label	EMC	AS / NZS 3548

FCC
47 Part 15 Sec 15.105

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Noise Emission	weighted according to DIN 45635 Part 1	Typical 60 dB (A) In Play and Standby

2.1.3 MECHANICAL DIMENSIONS

Shadow Telecine cabinet		
	Width:	1265 mm (49.80 inch)
	Height:	1942 mm (76.45 inch)
	Depth:	906 mm (35.67 inch)
	Weight:	approx. 460 kg (1015 lbs)
	Ground load	400 kp/m^2 (82 lbs/sq.ft.)
	Peak area load	<12.5 kp/cm^2 (<178 lbs/sq.in)
Transport crate	Width	2120 mm (83.46 in)
	Height	1050 mm (41.33 in)
	Depth	1550 mm (61.02 in)
	Weight	approx. 150 kg (331 lbs)

2.1.4 MAINS CONNECTION

Mains supply	3-phase current (UL approved) K-type fuse required	3 x 400 V, 60 Hz
	or	
	3-phase current (not UL approved)	3 x 400 V, 60 Hz
	or optional:	
	1-phase current (not UL approved)	1 x 230 V, 50 Hz
	2-phase current (UL approved) K-type fuse required	2 x 208 V, 60 Hz
	Note for Japan! 3-phase current 3 x 175V, 60 Hz not supported. Use 3-phase current 3 x 350 V, 60 Hz!	
Power Consumption	Typically	approx. 5 kVA
	3 Phases 400V= 5.5A / 6.5A / 9.5A	
	3 Phases 208V = 11A / 13A / 19A	
	2 Phases 208V = 22A	
	1 Phase 230V = 20A	

2.2 FILM TRANSPORT SYSTEM

Film size format

- 16mm
- S16mm
- FA (Super) 35 mm
- 35 mm in 4 perf, 3 perf and 2 perf
- Vistavision 35 mm in 8 perf (Option)
- Cinerama 35 mm in 6 perf (Option)
- S8 mm (Option)

Film types

- Color Print
  B/W positive; B/W negative; Color positive
- Color Negative
- Intermediate
- Primetime

Film transport

- Direct servo controlled capstan drive
- Feed and take up spooling servo controlled to provide constant film tension

Fixed speeds

Full resolution in forward and reverse mode	
25, 12 $^1/_2$, 6 $^1/_4$ 18 $^3/_4$ fps	at 625 lines / 50 Hz
29.97, 23.98, 17.98, 11.99, 5.99 fps	at 525 lines / 59.94 Hz
Reduced vertical resolution in forward and reverse mode	
57 fps	all standards

Select-A-Speed

- 2.00 to 57.00 fps in forward and reverse

Stop mode

- Frame accurate in full quality
- Spatial and color processing still possible

Variable visible search

With full size picture in a range of

2 fps to at least 150 fps **for 16 mm**

2 fps to at least 75 fps **for 35 mm**

Upper limit adjustable to 600 fps for 16 mm and 240 fps for 35 mm

Step mode

Single step forward and reverse with full resolution

Run-up time	to 25 or 24 fps	
	• Unlocked but correct speed	< 0,2 s
	• Locked to correct speed within	1,8 s
Picture stability		
35mm-4 Perf	Better than	± 0.06 %
	of full frame height / width for 35mm 4 Perf	
16mm	Better than	± 0.10 %
	of full frame height /width for 16mm film	
Framing adjustment	- 60 % ... + 60 % of total frame height	
Film capacity		
on spools :	Capacity with 16mm and 35 mm DIN or ANSI spools (diameter 54 cm / 2.1”),	Up to 1200m (3937 ft)
on cores :	Capacity with DIN- or ANSI- cores (diameter < 44 cm / 1.7”)	Up to 900 m (2952 ft)
A/B wind	Switch for clockwise and counterclockwise winding	
Film Switch	Stops film in shuttle before running from the spool / core	

2.3 ILLUMINATION AND FILM SCANNING SYSTEM

2.3.1 LIGHT SOURCE AND CONDENSER

Halogen lamp

- 250W Halogen lamp, long live type!
- Elapsed time meter

Optical matching filters

- Selectable filters for
  PRINT, NEG, INTERMED and “PRIMETIME”

Grey scale disc

- Adjustment of illumination level

Film Gate

- Air supported Film Gate with skid plate for smooth film handling
- with FA 35mm gateblock or S 16 mm gateblock

2.3.2 CCD SCANNER

Lens / Gate Assemblies (LGA)

Two different Lens / Gate Assemblies are possible, each consisting of projections lens and film gate. The two different types of Lens / Gate Assemblies available are:

- Full Aperture 35 mm Lens / Gate Assembly, achromatic color correction
- Super 16 mm Lens / Gate Assembly, achromatic color correction

Film gate

- Interchangeable with automatic detection
- Fast lock for easy cleaning
- FA 35mm LGA may be equipped with a 35mm gate block
- S 16 mm LGA may be equipped with a 16mm gate block or optional with a S8 mm gate block

Gate blast - mandatory

- Connector and hose provided for externally supplied compressed air to keep gate clean from dust.

Focus control

- Remote mechanical focus control for adjustment

Beam Splitter	● Dichroic beam splitter with R, G, B color filters on the output	
Pickup device	● Three Linear CCD Sensors	
Preamplifier & ADC	● Correlated double Sampling ● switchable gain	 0 dB / + 6 dB
X-Y Zoom	● Typical area magnification for SDTV ● Independent X and Y sizing possible ● X - Y panning and repositioning ● Anamorphic unsqueeze 2:1	0.1 x to 10.5 x
Geometry and linearity	Better than	0.5% of picture height
White Shading	Automatic compensated	< ± 2 % (γ = 0.4)
Fixed Pattern Noise (FPN)	Automatic compensation for pixel nonuniformity errors	< 0.5% of peak white with γ = 0.4
Aperture Correction	● H and V inband in relation to film, fixed	
Contour Correction	● H and V, TV - related ● > -12 dB....+12 dB at max. peaking frequency ● Peak frequency adjustable ● Coring adjustable	

2.4 VIDEO

TV standards	625/50, 525/59.94	2:1 interlace	CCIR 601
	4:4:4:4 or 4:2:2:4 or 8:4:4		CCIR 656
Display formats	4:3 and 16:9 full screen and horizontal / vertical letterbox		
Masking	• Choice of preset masking equations for different film stocks • Linear (MATRIX) or logarithmic (MASKING) depending on selected film stock		
System timing adjustable	Vertical:		1 frame
	Horizontal:		1 TV line
Signal / Noise ratio	Measured at 50% video level, gamma = 0.4, The ratio being 700mV divided by r.m.s. noise voltage		
	for luminance		> 58 dB
	red		> 55 dB
	green		> 55 dB
	blue		> 55 dB

Digital color correction

MATCHING	RGB-Gain	
	RGB-Black	
BLACK	MASTER	
	RGB	
WHITE	MASTER	
	RGB	
Gamma	MASTER	
	RGB	
	CRT	1.00 / 0.45
Extended Ranges	Lift Master	–100% +100%
	Lift RGB	–100% +100%
	Gain Master	0% - 1000%
	Gain RGB	0% - 200%
	Gamma Master	0 - 2.5
	Gamma RGB	± 60% of Master Range
CR-Saturation	Continuous variable adjustable	0% 200%

Digital Blanking

- Control of size, H- and V-position
- Adjustable full frame horizontal / vertical
- Fixed wide screen blanking

Effect Filter Kit

- Clear supermist filters: 0.25, 0.5, 1.00, 2.00, 3.00 and optical flat (clear)
- Black supermist filters: 0.25, 0.5, 1.00, 2.00, 3.00

2.5 CONTROL SYSTEM

Basic Local Control	Implemented in the Telecine cabinet. Offering basic functions to load the film such as: STAND BY ON/OFF FPN correction A/B wind FRAMING PLAY FWD/REV STEP FWD/REV STOP SHUTTLE FWD/REV LOCAL/REMOTE POWER ON/OFF FOCUS
GCP1 ***Graphical Control Panel***	Full operating and service control of all functions, to be mounted separate from the Shadow Telecine Dimension: Height 5 Rack Units 223 mm (8.78 in)
Telecine Controller	Interface e.g. to a Pandora or DaVinci telecine controller / programmer / editor (standard operation control)

2.6 WAVEFORM MONITORING

Application

- Color Grading in RGB
- Focus adjustment
- Video path checking
  (except MTF measurements)

Features

- Monitoring of the color signals inside the digital signal processing and at the outputs.
- Single, parade or superimposed display

Waveform monitors

supported monitors for interfacing:

- Philips PT 5464 HD
- TEK 1735 / 1730 HD
- TEK 1740 / 1750 / 1760 SDTV
- TEK WFM 300/300A SDTV
- Philips PT 5664 SDTV

Max. cable length

- Nokia 0,6/2,8/4,7 double shielded:
  up to 5 m /AF/75 Ω
- Nokia 1,0/4,7/7,4 double shielded:
  up to 20 m /AF/75 Ω

For cable lengths more than 25 m, cable equalizers are recommended.

Control

Via cheapernet interface

2.7 INPUT / OUTPUT INTERFACES

iMCS	● 4x RJ45 connectors, twisted pair cables, distribution by internal HUB	
	● 1x BNC (internal HUB)	
	● Standard IEEE 802.3	
	● RJ45 terminal panel plus internal hub for up to 4 remote panels to telecine controllers	
	● Cable length:	< 100 m
FRS OUT	● BNC	
	● FREEZE SIGNAL marking repeated fields,	TTL - Pulse
	● Polarity configurable	
CFR IN	Input used for synchronization of the telecine to a controller / programmer / editor (pulldown, fixed speed sequences)	TTL - Pulse
CFR OUT	Output used for synchronization of a telecine controller / programmer / editor (pulldown, fixed speed sequences)	TTL - Pulse
SEPMAG OUT	● Sepmag interface	
	● D-sub 9-pole female	
	● Configurable to 10x Bi Phase (250 / 240 Hz) or 2x Bi Phase (50 / 48) 1x Bi Phase (25 / 24)	
EXTERN AUX	● Telecine controller interface	
	● 25-pin sub D, female	
	● SOF_Film, SOF_Studio (FRID), FWD/REV, ..	
LTC OUT	● Linear time code interface compatible to SMPTE 12M standard	
	● XLR male connector	

2.7.1 VIDEO

DIGITAL VIDEO OUT

- CCIR 656 LINK A / B
- D sub 25 pin, female parallel and BNC serial
- 4 : 2 : 2 or 4 x 4 format
- 8:4:4
- Y, C_B, C_R, K

ANALOG VIDEO OUT

- BNC
- R, G, B, S, K or Y, C_B, C_R, S, K

EXT REF BNC input for ext. reference sync

2.7.2 AUDIO (optional)

DIGITAL OUT 1/2	XLR male	channel 1,2	(AES/EBU format)
ANALOG IN 1	XLR female	balanced audio input channel 1	
ANALOG IN 2	XLR female	balanced audio input channel 2	
ANALOG OUT 1	XLR male	balanced audio output channel 1	
ANALOG OUT 2	XLR male	balanced audio output channel 2	
SR IN 1	XLR female	balanced Dolby-SR/SRD-audio input channel 1	
SR IN 2	XLR female	balanced Dolby-SR/SRD-audio input channel 2	
SR OUT 1	XLR male	balanced audio output to a Dolby-SR processor channel 1	
SR OUT 2	XLR male	balanced audio output to a Dolby-SR processor channel 2	

MONITOR L	XLR male	balanced audio output to an active speaker, left channel
MONITOR R	XLR male	balanced audio output to an active speaker, right channel

Audio Ref Audio Synchronization

48 kHz IN BNC, female,
48 kHz clock input to synchronize the audio processor with external digital audio components

48 kHz OUT BNC, female,
48 kHz clock output to synchronize external digital audio components

2.7.3 WAVEFORM MONITORING

ANALOG OUT	BNC: For waveform monitoring only!	R, G, B, S

CTRL D-sub15-pin female connector for remote control of waveform monitor or vectorscope
Maximum Cable Length: 50 m (150 feet)

2.8 OPTIONS

2.8.1 AUDIO

Audio format:

COMMAG 16mm,		MONO
COMOPT 35mm,		MONO/STEREO
COMOPT 16mm,		MONO

Inputs:

Input	Level	Impedance
ANALOG IN 1, L ANALOG IN 2, R balanced, floating	LEVEL switchable -3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level	> 10 kΩ
SR IN 1 SR IN 2 balanced, floating	LEVEL switchable -3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level	> 10 kΩ

Outputs:

Output	Level	Impedance
ANALOG OUT 1 ANALOG OUT 2 balanced, floating	LEVEL switchable -3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level	< 40 Ω
MONITOR L MONITOR R balanced, floating	LEVEL switchable -3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level volume control off to +6dB	< 40 Ω active speaker required
SR OUT 1 SR OUT 2 balanced, floating	LEVEL switchable -3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level	< 40 Ω
DIGITAL OUT 1/2	5 Vpp	110 Ω

Test oscillator: 1 kHz and 10 kHz
-3 / 0 / +4 / +8 dBm switchable to ANALOG OUT

Frequency response: 1 kHz reference, 10 dB below full level

COMOPT	16 mm	40 Hz ... 8 kHz	- 2 dB .. + 2 dB
	35 mm	40 Hz .. 12,5 kHz	- 2 dB .. + 2 dB
	Measured with comopt sound frequency test film according to DIN 15506		
COMMAG	16 mm	40 Hz ... 12,5 kHz	± 2 dB
	Measured with commag sound frequency test film according to DIN 15638 BF 16		

S/N ratio:

COMOPT	S/N ratio weighted (CCIR 468-4):	
	16 mm	> 52 dB
	35 mm	> 60 dB
	S/N ratio unweighted r.m.s:	
	16 mm	> 58 dB
	35 mm	> 66 dB
	Reference measured at full level (+ 6 dBu / + 9 dBu with 9 dB lead,+ 12 dBu / + 16 dBu with 8 dB lead), Shadow Telecine running without film but comopt lamp switched on, measured with peak voltage meter according to CCIR 468-4.	

Audio Delay Speed controlled digital audio delay for the compensation of the sound to picture offset.

2.8.2 DATA OUTPUT (PHANTOM TRANSFER ENGINE TE 4101)

System application	High-speed film data output for film processing and archiving	
Data resolution (Image Size)	● Selectable horizontal: vertical:	 256.....2048 256.....1832
	● Fixed square pixel formats:	1920 x 1080, 720 x 540 720 x 405
File format	● HIPPI FP ANSI x3.210 - 1992	
	● DPX format, according to SMPTE 268M-1994 (3x10-bit RGB, Cineon compatible)	
	data segmentation: Thomson implementation; only image data and file information, no control data	
Transfer rate (Film speed)	Depending on system configuration and selected image size e.g.: ~ 5 fps for 1920x1440 10-bit RGB pixel	
Data interface parallel	● 32 bit / 100 MB/s HIPPI source; only output; 100 pin parallel connector; HIPPI-PH ANSI X3.183-1991, cable length < 25 m (cable not supplied)	

Data interface serial

- HIPPI-Serial (ANSI X.3.300-1997)
  32 bit (800 Mbit/s) configuration, dual simplex connection
  Transmission: 1.2 Gbit/s, 850 nm typ.;
  VCSEL light source;
  Signalling sequence and protocol compatible;
  HIPPI-PH ANSI X3.183-1991;
  Overhead bits OHI to OH7 not supported;
  Reception: link control, 770 to 860 nm center wavelength 0 to - 17 dbm optical power range;

  Optical Duplex SC Connector
  AEL Class I laser per EN 60825-1
  Transmitting distance up to 500 m with 50/125µm MMF cable.

2.8.3 ROTATION

Range	-180° to +180° image rotation also available in STOP

2.8.4 HDTV

TV standards	1250/50	1125/60	1125/59.94
	1920 x 1080 / 60 and 59.94		2:1 interlace
	1280 x 720p / 60 and 59.94		2:1 interlace progressive
Display formats	full screen and horizontal / vertical letterbox		4:3 and 16:9
Fixed speeds	See corresponding SDTV speeds for		
	50 Hz standards –> 625 lines / 50 Hz		
	59.94 Hz standards –> 525 lines / 59.94 Hz		
	for 1125 lines / 60 Hz		30, 24, 18, 12, 6 fps
X-Y Zoom	Typical area magnification / HDTV		x 0.05 to x 1.5
Resolution	Depth of modulation 0.5 MHz to 18 MHz. For center & corner (Film losses not taken into account)		> 40%
Signal / Noise ratio	Measured with ND=1 in the vision gate, γ= 0.4:		> 50 dB for all channels

Digital Video Out

- CCIR Link A, B
  D sub 50 pin
- ”4 : 2 : 2 ” or ”4 x 4”
- Pinning according to CCIR TG11
- Serial 2xBNC via included converters
  Note: Standard 1250 - 50 Hz only in parallel mode available.

Analog Video Out

- BNC
- R, G, B, S, K or Y, C_B, C_R, S, K
- Filtering according to EU95 - Nov. 1992

EXT REF

- BNC input for external trilevel sync

2.8.5 OPTION DTV (REQUIRES HDTV OPTION)

TV standard

- 1280 x 720 / 60 Hz progressive
- 1280 x 720 / 59.94 Hz progressive
- 1920 x 1080 / 24 Hz progressive
- 1920 x 1080 / 23.98 Hz progressive
- 1920 x 1080 / 25 Hz progressive
- 1920 x 1080 / 24 segmented frame
- 1920 x 1080 / 23.98 segmented frame
- 1920 x 1080 / 50 interlaced 2:1

Extern Reference

With analog trilevel sync according to SMPTE 296M (1280 x 720 P)
or
SEMPTE 274M (1920 x 1080) is possible

Monitoring

At post spatial processor test points only the first 921 pixels of a line are displayed.

Film speeds

• 60 Hz standards	30, 24, 18, 12, 6 fps
• 59.94 Hz standards	29.97, 22.98, 17.98, 11.99, 5.99 fps
• 24 Hz standards	24, 18, 12, 6 fps
• 23.98 Hz standards	23.98, 17.98, 11.99, 5.99 fps

2.8.6 OPTION VISTAVISION (REQUIRES OPTION ROTATION)

Film size format	● FA 35mm 8-perf (Vistavision) Resolution: horizontal scan lines vertical scan pixels	 1500 1920
	● FA 35mm 6-perf (Cinerama)	
	In 6-perf and 8-perf, ACA emulation and marker insertion are not supported.	
Fixed speeds	● 50 Hz standards	25, 12.5, 6.25 fps
	● 59.94 Hz standards	29.97, 17.98, 11.99, 5.99 fps
	● 60 Hz standards	30, 18, 12, 6 fps
Select a speed		2.00 - 31.00 fps

2.8.7 6-SECTOR COLOR PROCESSOR

System	Secondary Color Processing The design and implementation is 100% digital integrating perfectly within the high speed digital signal processing architecture of the Telecine. It employs up to 16 bit quantization and operates in real time at up to 2K resolutions.	
Color Qualification	● 6 Sectors (Hue) (selection of the color that is to be modified)	Red, Yellow, Green, Cyan, Blue, Magenta;
Sector adjustment (Hue)	● 6 x Position	-30^0... 0 ...$+30^o$
	● 6 x Width	180^0 ...60^0 ...15^0
Color Modification	Correction of the selected sector	
	● Luminance	0 ..100% .. 200%
	● Saturation	0 ..100% ...200%
	● Hue	-180^0 ..0 ..$+180^0$
Master Correction	● Master Saturation	0 ..100% ...200%
	(all other Master Corrections as such as lift, gain and gamma are functions of the Primary Color Processor of the basic Shadow Telecine)	
Limiter & Legalizer	● Limiter in Luminance Soft or hard clipping switchable	
	Clip levels adjustable	100%, 102%, 108%
	● Legalizer in Chrominance Saturation remains within selected legal limits: R G B	100%, 102%, 108%
Control	Functional Control Panel: All 6 SC Processor controls are provided	
Operator Control	Via external Controllers / Programmers / Color Correction Systems e.g. from Pandora, DaVinci ...	

Control Interface	Via serial iMCS bus
	The Mounting & Operating Instructions are described in the Customer Manual FU 0095, order no. 0 126 629 500

3. SYSTEM APPLICATIONS

The Shadow Telecine STE-B1 may be connected to a great variety of video, audio, data processing and controller equipment.

It can be equipped with all necessary digital and analog outputs.

This chapter will give the user some examples of typical Telecine applications.

The Telecine configurations are made in the main menus of the GCP1 Graphical Control Panel.

Trademarks **All brand and product names are trademarks of their respective companies.**

Technical changes **Technical information in this document is subject to change without notice.**

3.1 SDTV Film to Tape Application / Pandora “Pogle” and Noise Reducer VS 4

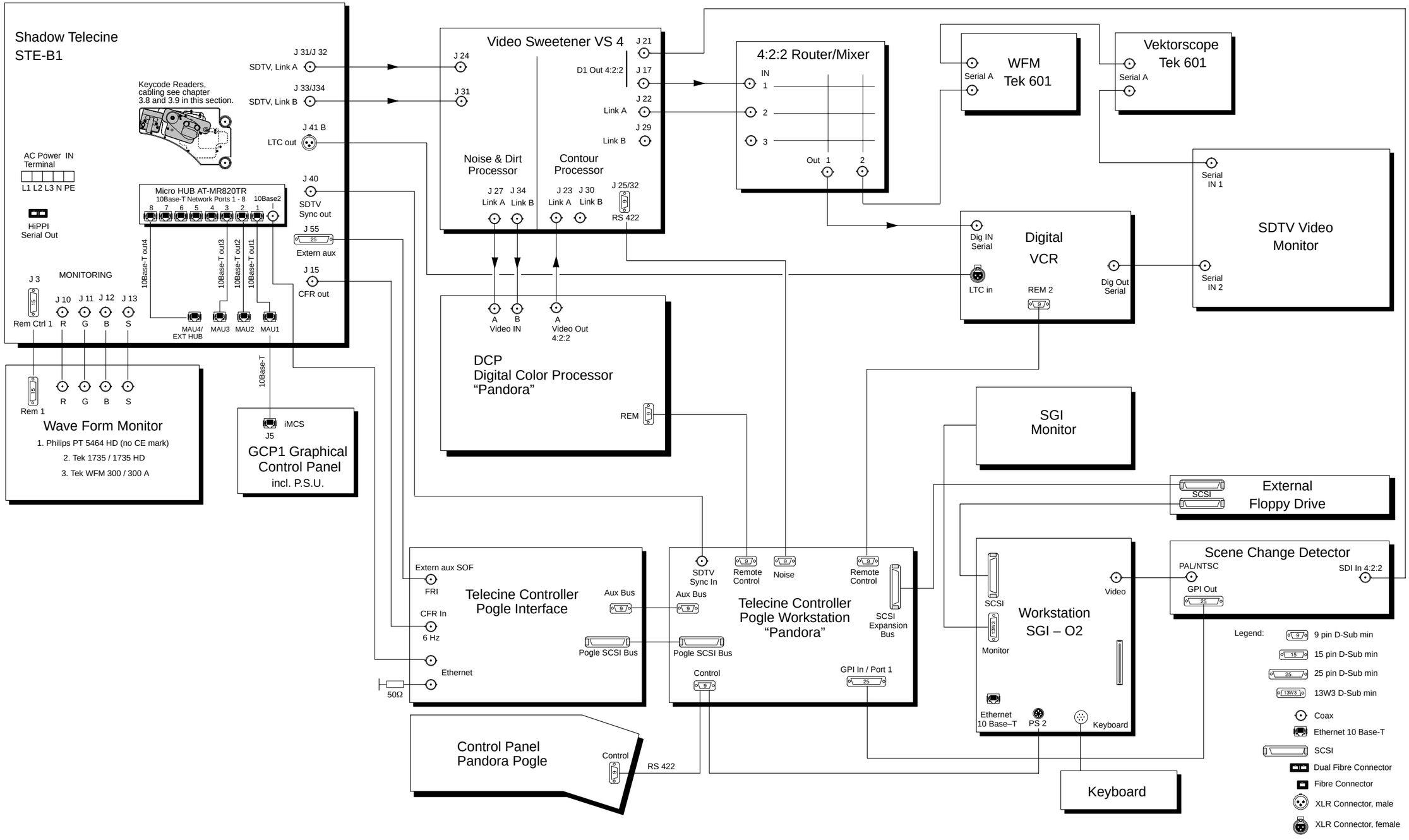


Fig. 301: Shadow Telecine with telecine controller Pandora “Pogle“ and Noise Reducer VS 4

3.2 SDTV Film to Tape and Data Application / Pandora “Pogle”, Grain Reducer SCREAM and Phantom Transfer Engine

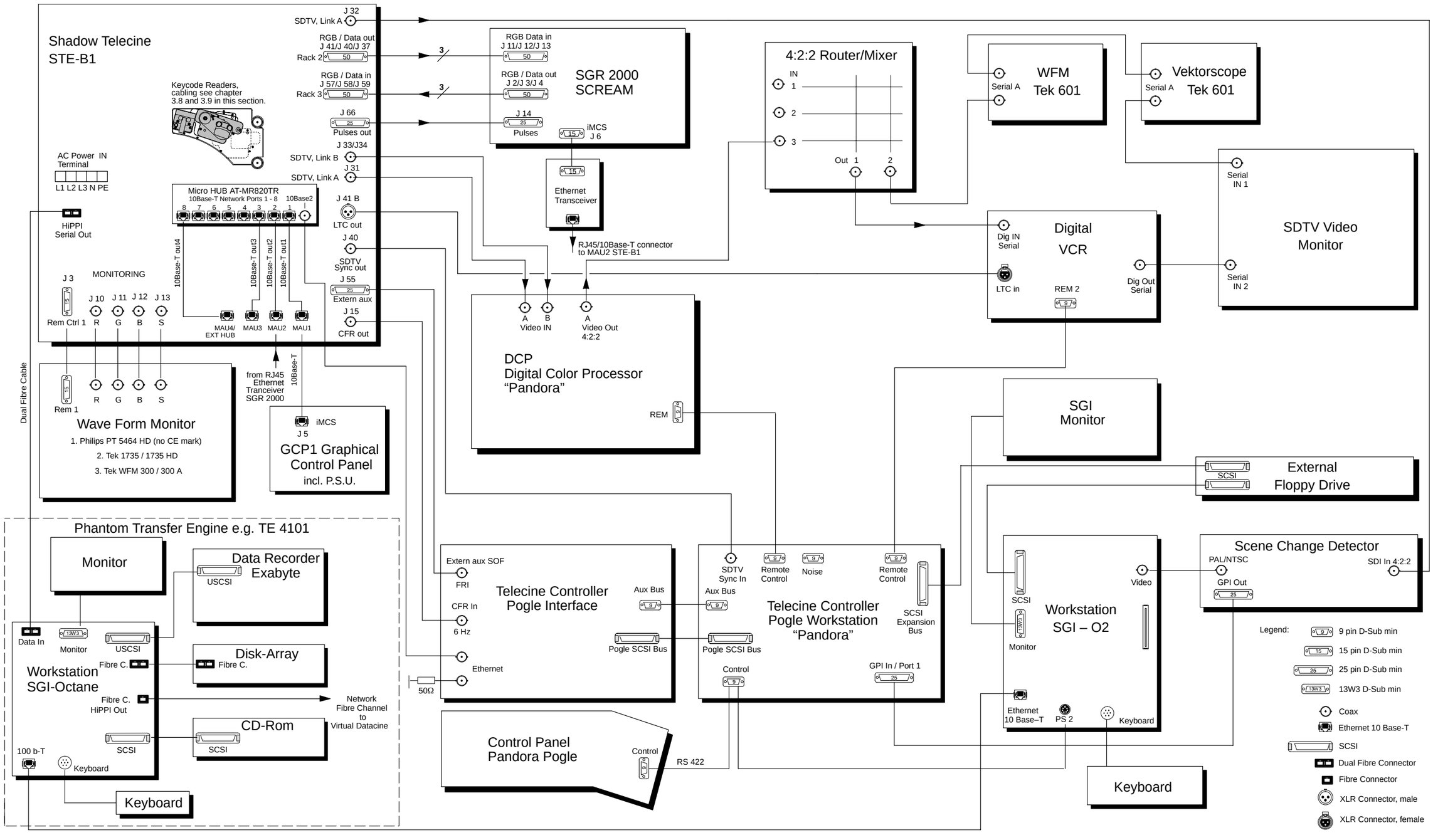


Fig. 302: Shadow Telecine with telecine controller Pandora “Pogle“, SGR 2000 and Phantom Transfer Engine

3.3 SDTV Film to Tape Application / DaVinci “Renaissance” and Noise Reducer VS 4

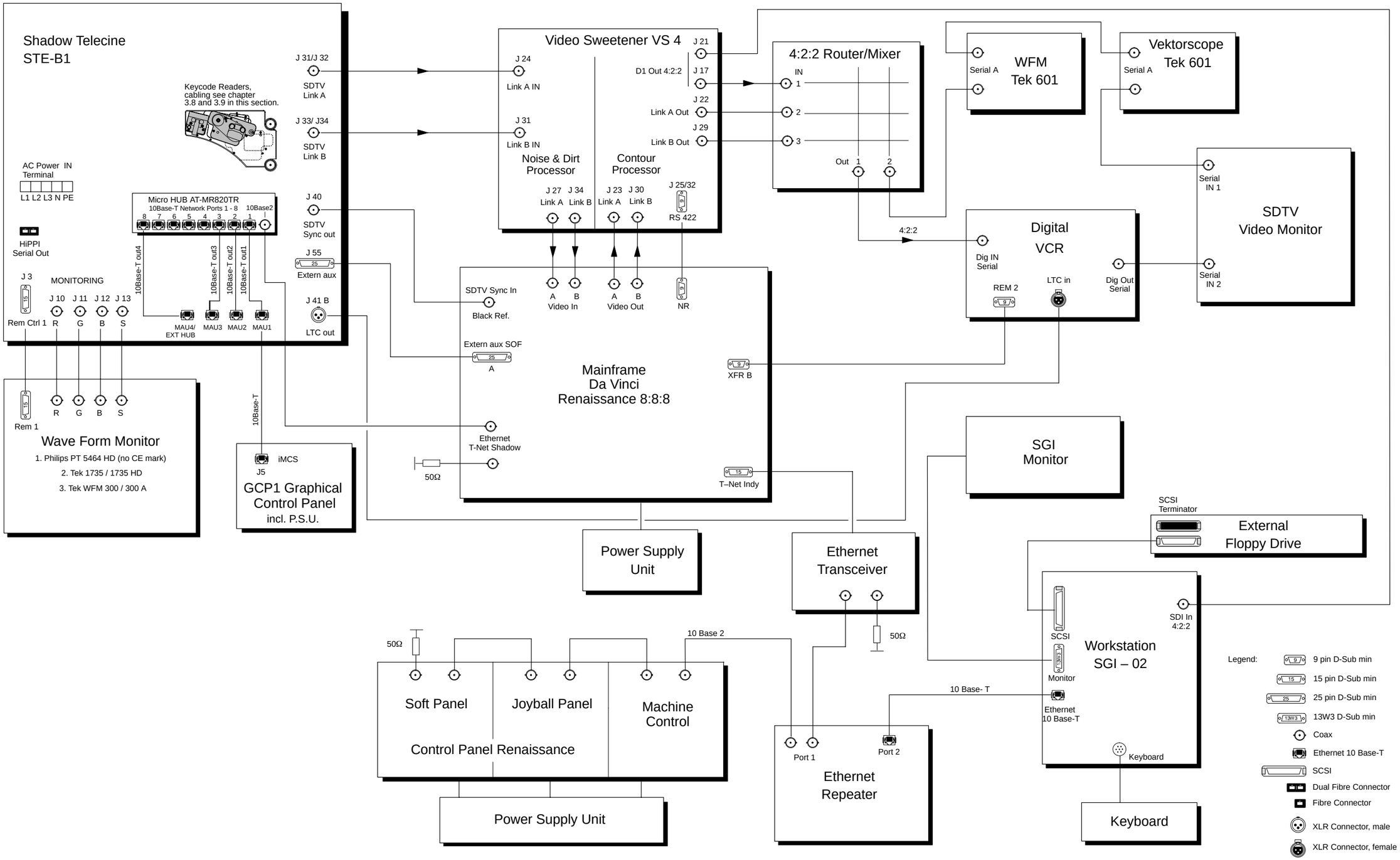


Fig. 303: Shadow Telecine with telecine controller Da Vinci “Renaissance” and VS 4

3.4 SDTV Film to Tape and Data Application / DaVinci “Renaissance”, Grain Reducer SCREAM and Phantom Transfer Engine

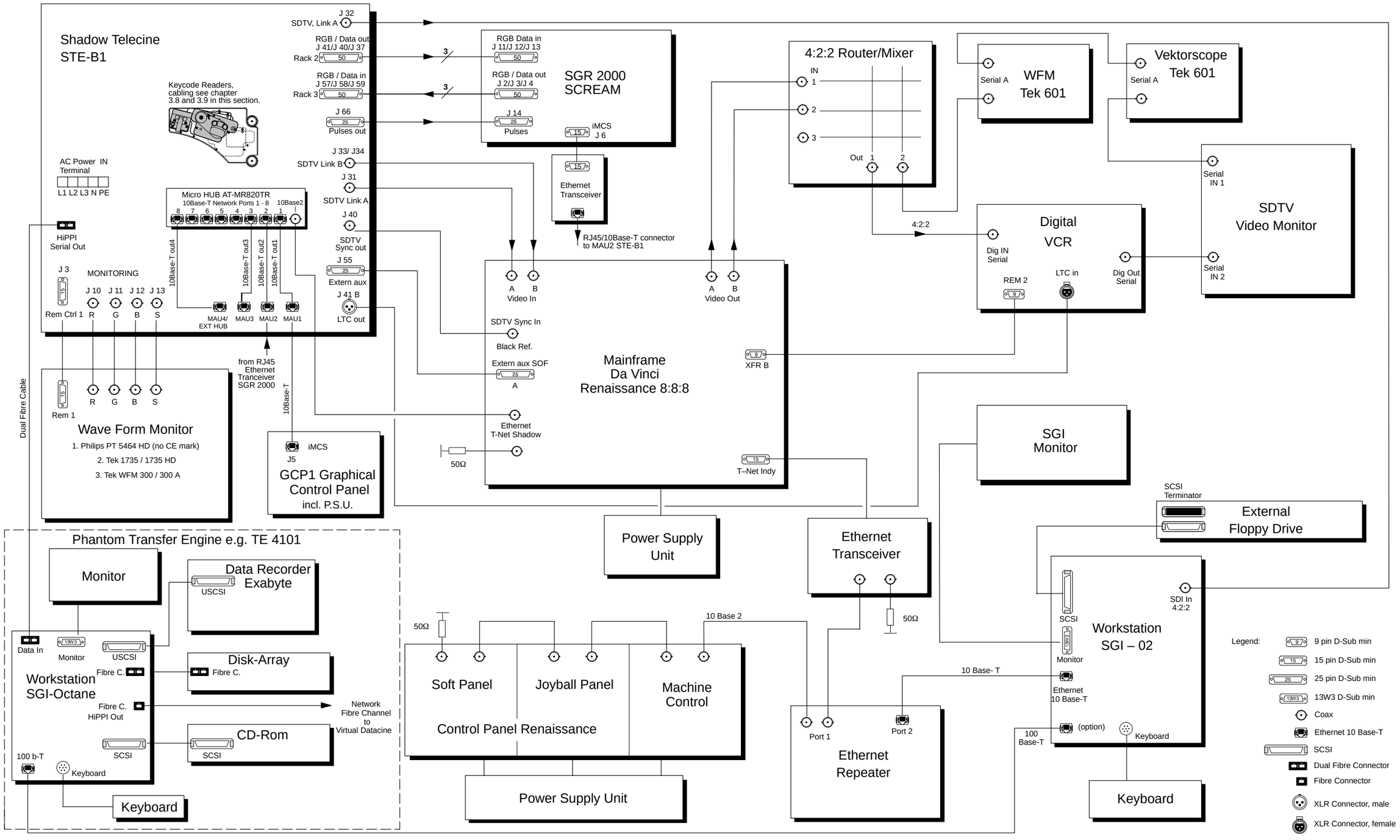


Fig. 304: Shadow Telecine with telecine controller Da Vinci “Renaissance”, SGR 2000 and Phantom Transfer Engine

3.5 SDTV Film to Tape Application / DaVinci “2K” and Noise Reducer VS 4

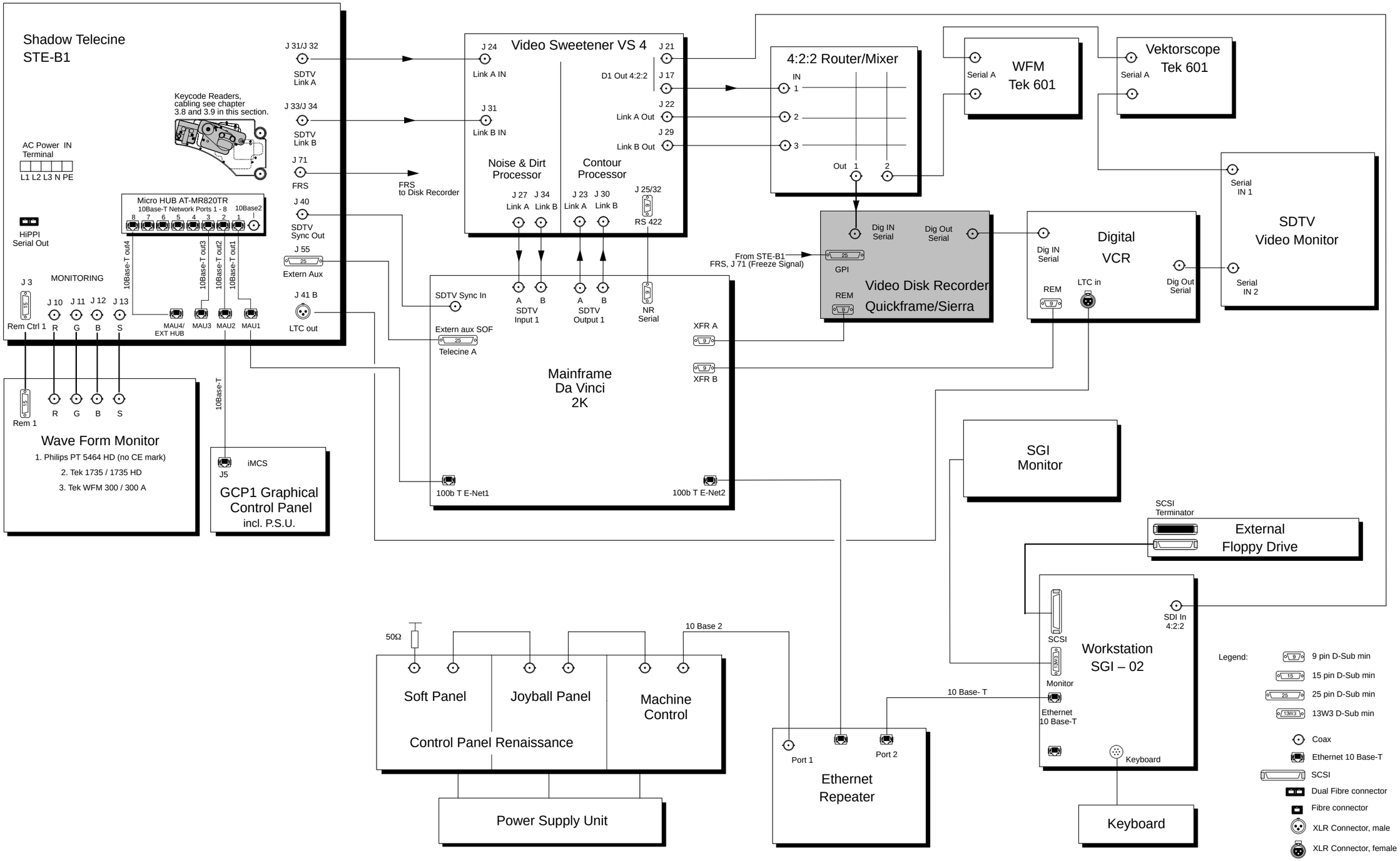


Fig. 305: Shadow Telecine with telecine controller Da Vinci “2K” and VS 4

3.6 SDTV Film to Tape and Data Application / DaVinci “2K”, Grain Reducer SCREAM and Phantom Transfer Engine

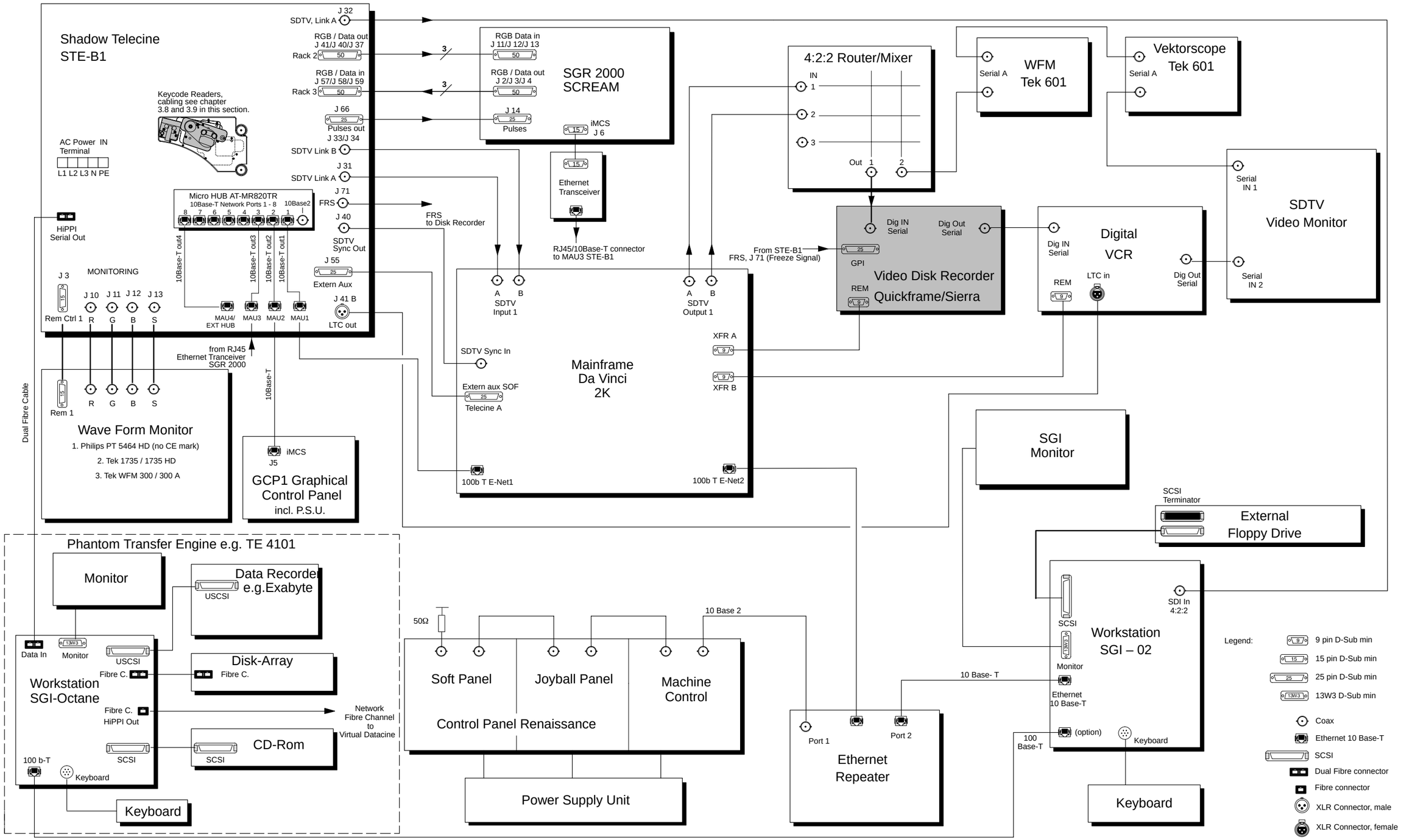


Fig. 306: Shadow Telecine with telecine controller Da Vinci “2K”, SGR 2000 and Phantom Transfer Engine

3.7 HDTV Film to Tape and Data Application / DaVinci “2K”, Grain Reducer SCREAM and Phantom Transfer Engine

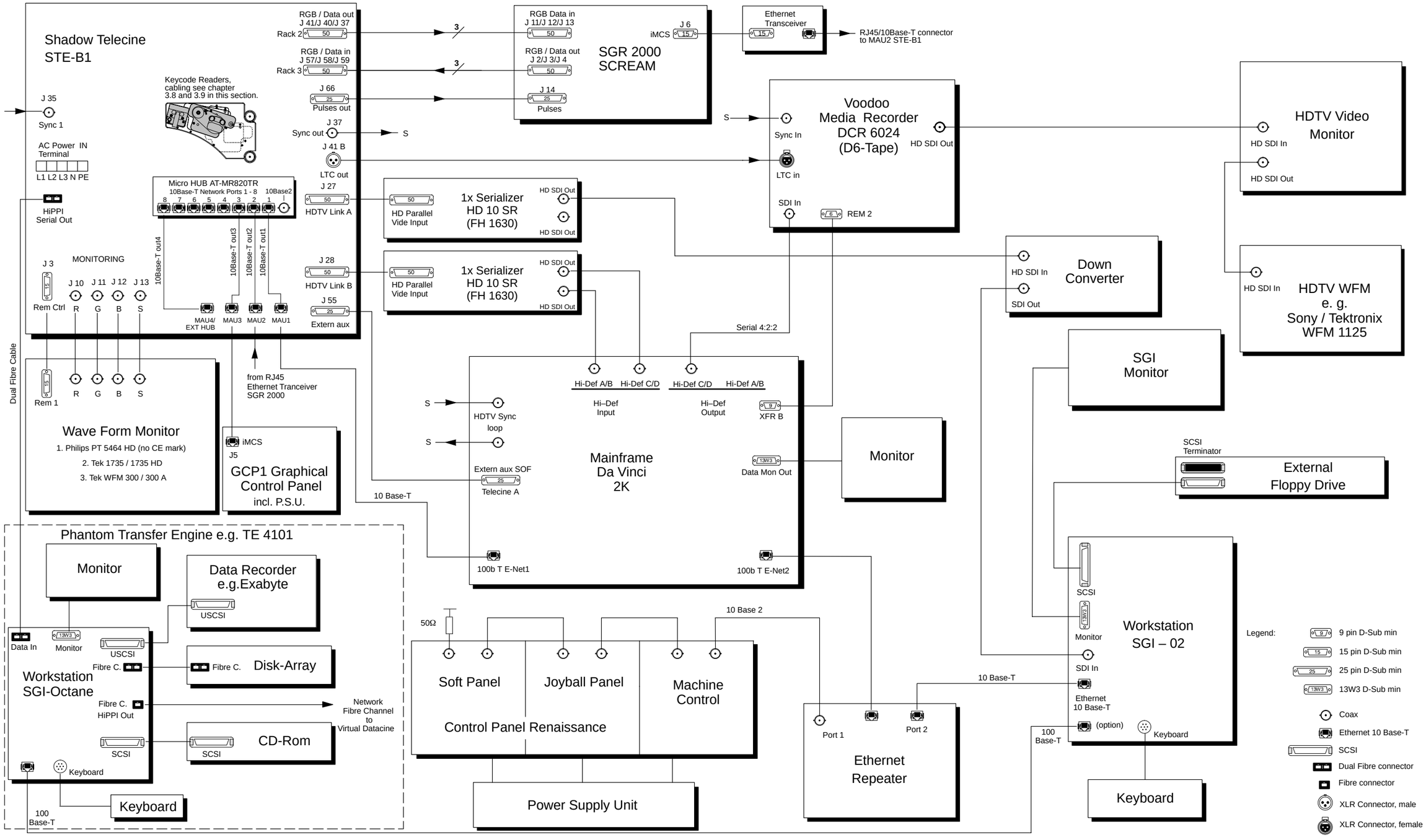
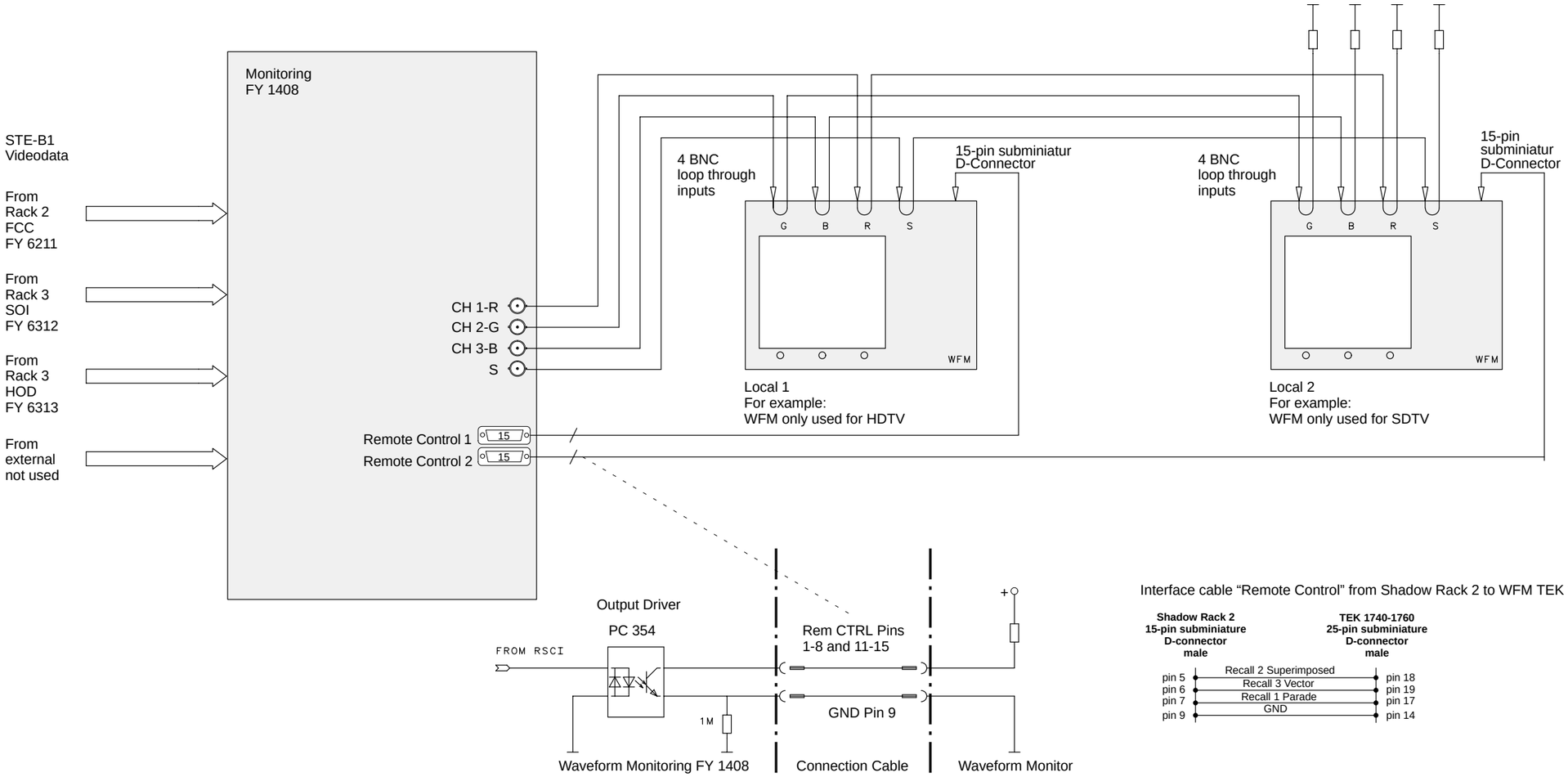


Fig. 307: Shadow Telecine with telecine controller Da Vinci “2K”, SGR 2000 and Phantom Transfer Engine

3.8 Waveform Monitoring



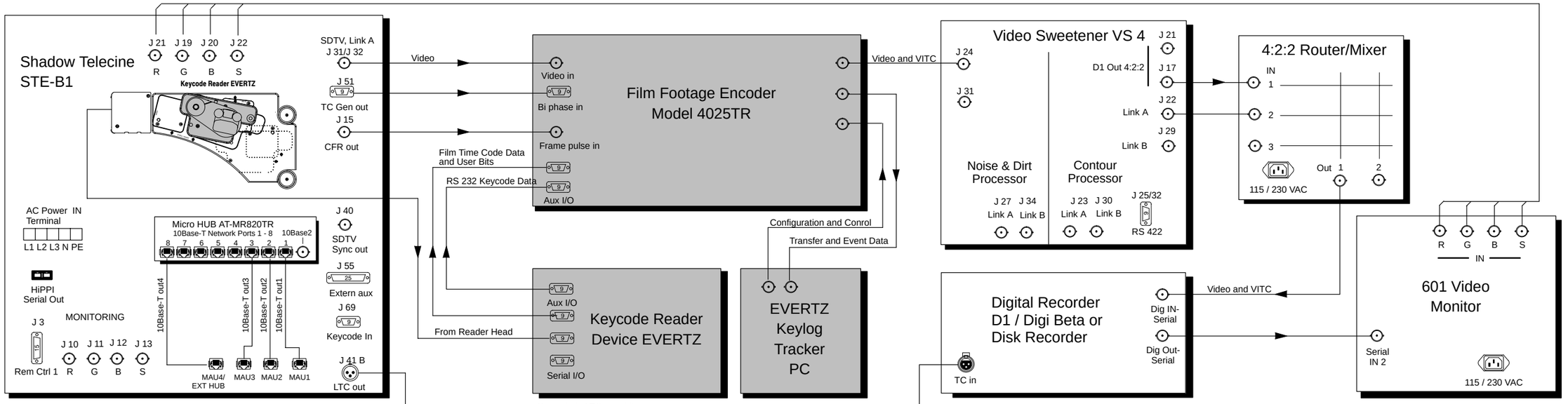
Interface cable “Remote Control” from Shadow Rack 2 to WFM TEK 1740-1760

Note: ***Interface cable “Remote Control” from Shadow Rack 2 to PT 5664 Disconnect pin 1 of the control cable PT 5664, otherwise the remote control functions are disturbed.***

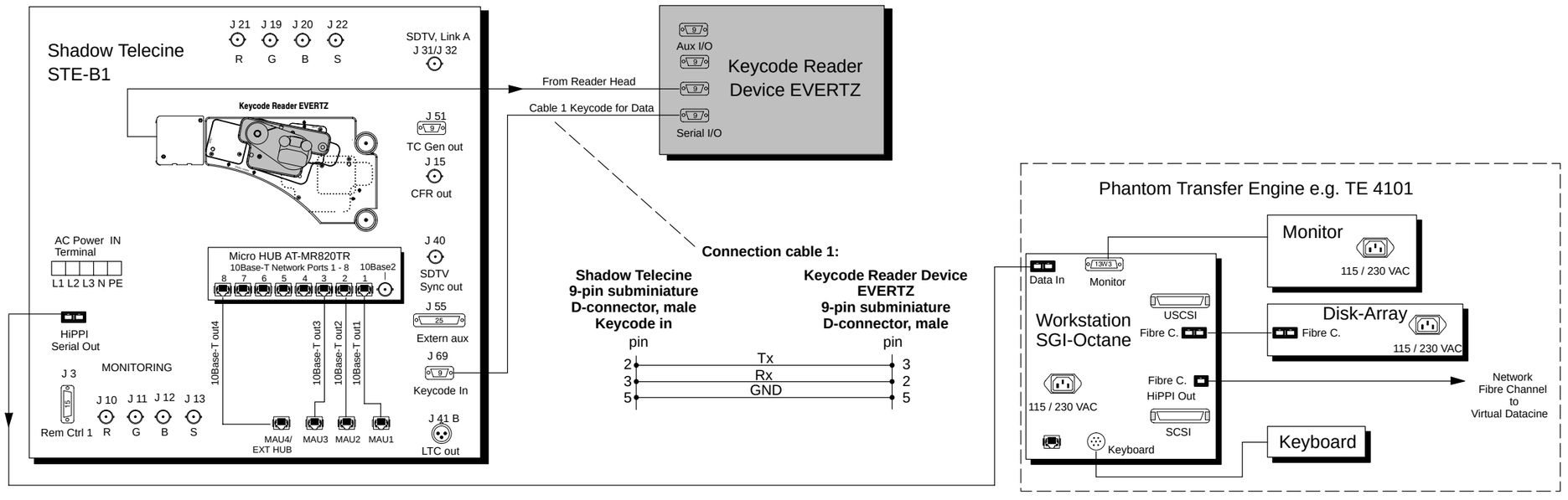
Fig. 308: Waveform Monitoring

3.9 Keycode Applications EVERTZ

3.9.1 Keycode in SDTV, LTC-Out and VITC

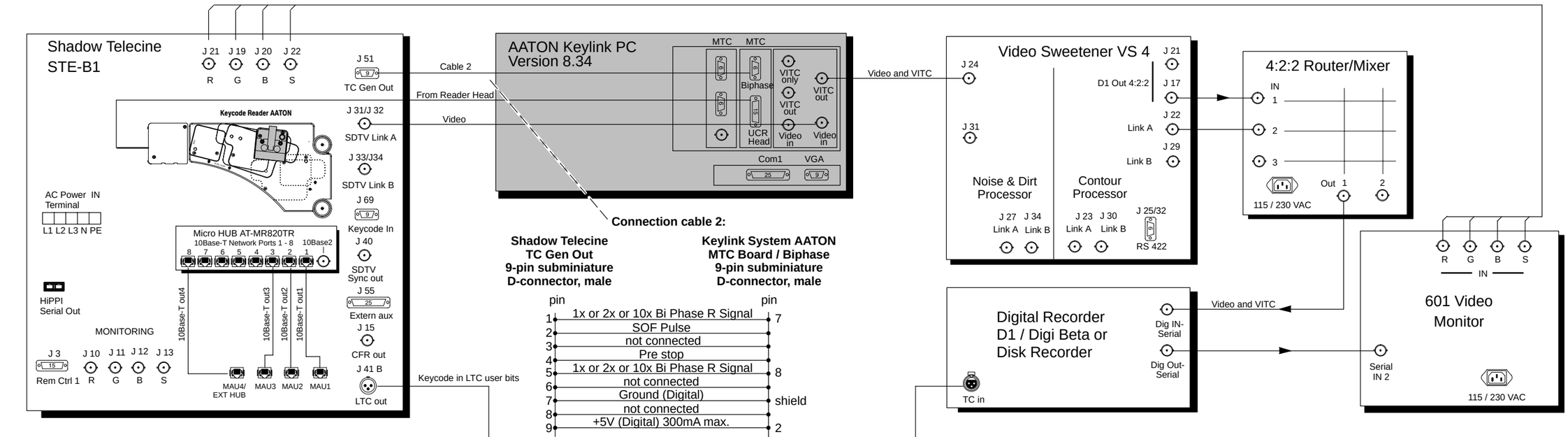


3.9.2 Keycode in Data

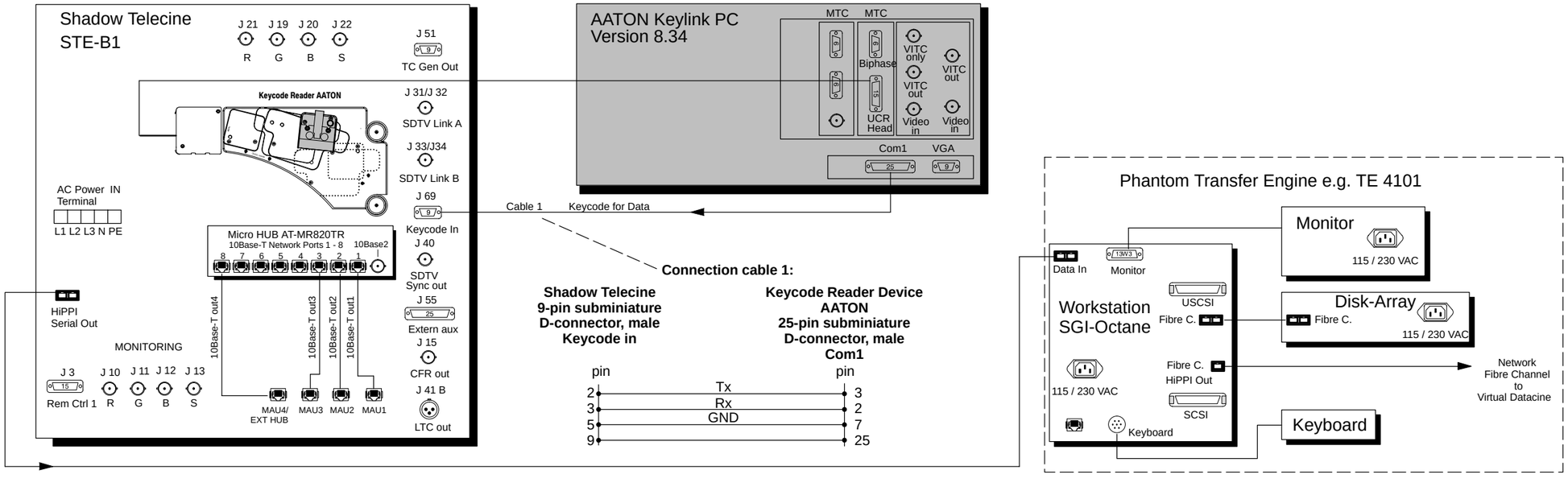


3.10 Keycode Applications AATON

3.10.1 Keycode in SDTV, LTC-Out and VITC

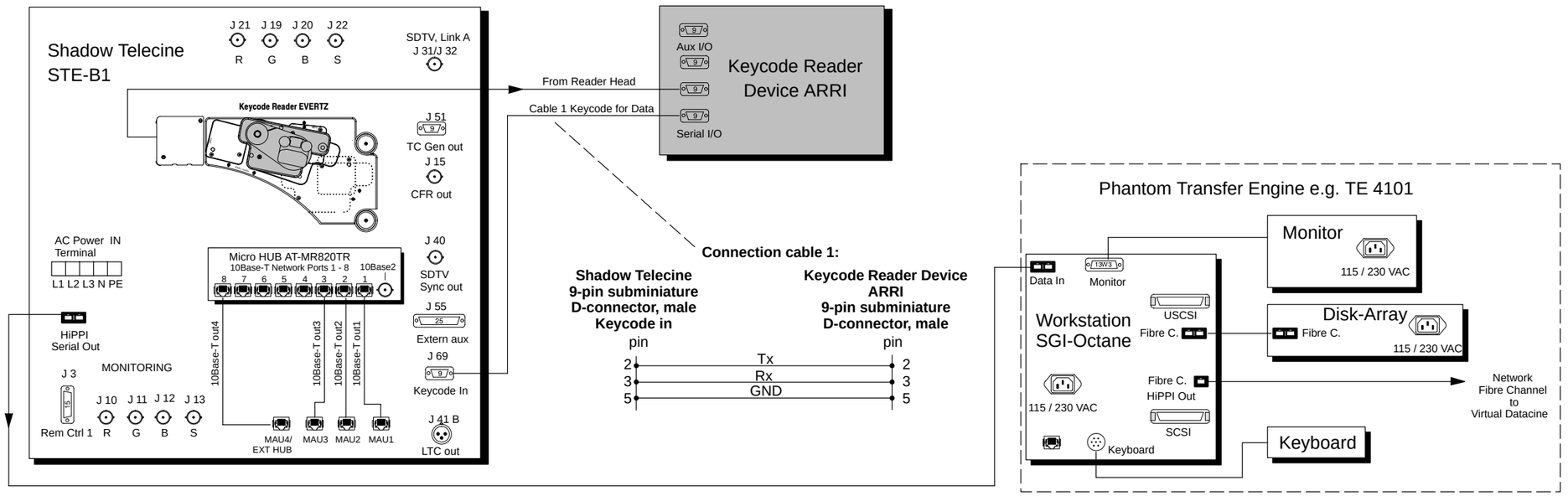


3.10.2 Keycode in Data



3.11 Keycode Application ARRI

3.11.1 Keycode in Data



4. INSTALLATION



Important note for the installation!

Before switching on the Shadow Telecine, it is absolutely necessary to install the separately delivered condenser lenses, with additional heat absorbing filter, into the lamp house. Otherwise the gray density disk and the film may be destroyed by the burning projector lamp!

Installation steps:

- Unpacking Shadow Telecine and accessories
- Setting upright
- Establish the recommended ventilation conditions
- Removal of Styrofoam elements
- Installing the Local Control Panel
- Installing the handles at the front doors
- Installing the Graphical Control Panel GCP1
- Connecting an external gateblast compressor
- Mounting the filters and lenses in the lamp house
- Installation of the LGA

4.1 WARNINGS

The telecine unit weights approx. **1015 lbs / 460 Kg!**



Attention:
The telecine unit has to be unpacked and lifted up by authorized forwarding agencies only, with appropriate lifting tool under control and instruction of Thomson service personnel!

Danger of injury when the telecine is being lifted to the upright position!



Mains installation **must** only be done by qualified personnel!



Power supply in excess of 40 volts are potentially hazards or lethal.
At no time should contact be made with the machine wiring or terminals, except via a probe with appropriate insulating properties.



The Shadow Telecine is designed to be operated with locked front and rear doors. The rear doors must only be removed by qualified service personnel for maintenance purposes. The Shadow Telecine cannot operate with open filmdeck doors. An interlock switch is fitted for safety purposes. Do not modify the operation of this switch.

4.2 UNPACKING

The telecine unit weights approx. **1015 lbs / 460 Kg!**

Attention:
The telecine unit has to be unpacked and lifted up by authorized forwarding agencies only, with appropriate lifting tool under control and instruction of Thomson service personnel!

Danger of injury when lifting the telecine to the upright position!

The telecine unit lies on its back in the transport crate. The accessories are contained in a separate transport case.

4.3 INSTRUCTIONS FOR AUTHORIZED FORWARDING AGENCIES ONLY!

Unpacking

- For unpacking, first remove the straps around the transport crate.
- Open the upper fixing screws (fig. 401/**A**) of the transport crate lid.
- Lift up and remove the transport crate lid (fig. 401/**1**).
- Remove padding layers.
- Open the fixing screws of the side walls (fig. 401/**2, 3**) and remove them.
- Cut open the cover foil at the three lower sides and remove it.
  Now the Shadow Telecine is prepared to be set upright.

Setting upright

The unit can be set upright only with appropriate lifting tool under control and instruction of Thomson service personnel!

The unit has a net weight of approx. **1015 lbs** or **460 kg** and is supported on 4 bottom rollers for moving to its final location.

- Push the cabinet with its bottom approx. **1 – 1.2 inch** or **2 – 3 cm** close to the edge of the transport crate (fig. 400).
- Turn the two lower bottom rollers upwards for protection (fig. 400/**C**).
- Fix two (or four) hooks of the lifting tool onto the two lower (or onto all four) loops of the cabinet (fig. 400/**B**).
- Lift up the cabinet slowly while two persons support it from both sides until the two upper bottom rollers are standing on the floor.
- Continue lifting up until the bottom plate of the transport crate can be pulled out. Take care that the cabinet cannot roll away.
- Put down the cabinet slowly until the two lower bottom rollers are also standing on the floor.

Ground load

The floor space amounts 12.1 sq. ft. or 1,12 m^2 and results in a **ground load of 82 lbs / sq. ft.** or **400 kp / m^2**.

Setting up

The bottom rollers enable the Shadow Telecine to be moved to its final location.

Caution!
Do not move the telecine unit over coarse floor unevenness otherwise the bottom rollers could be broken.

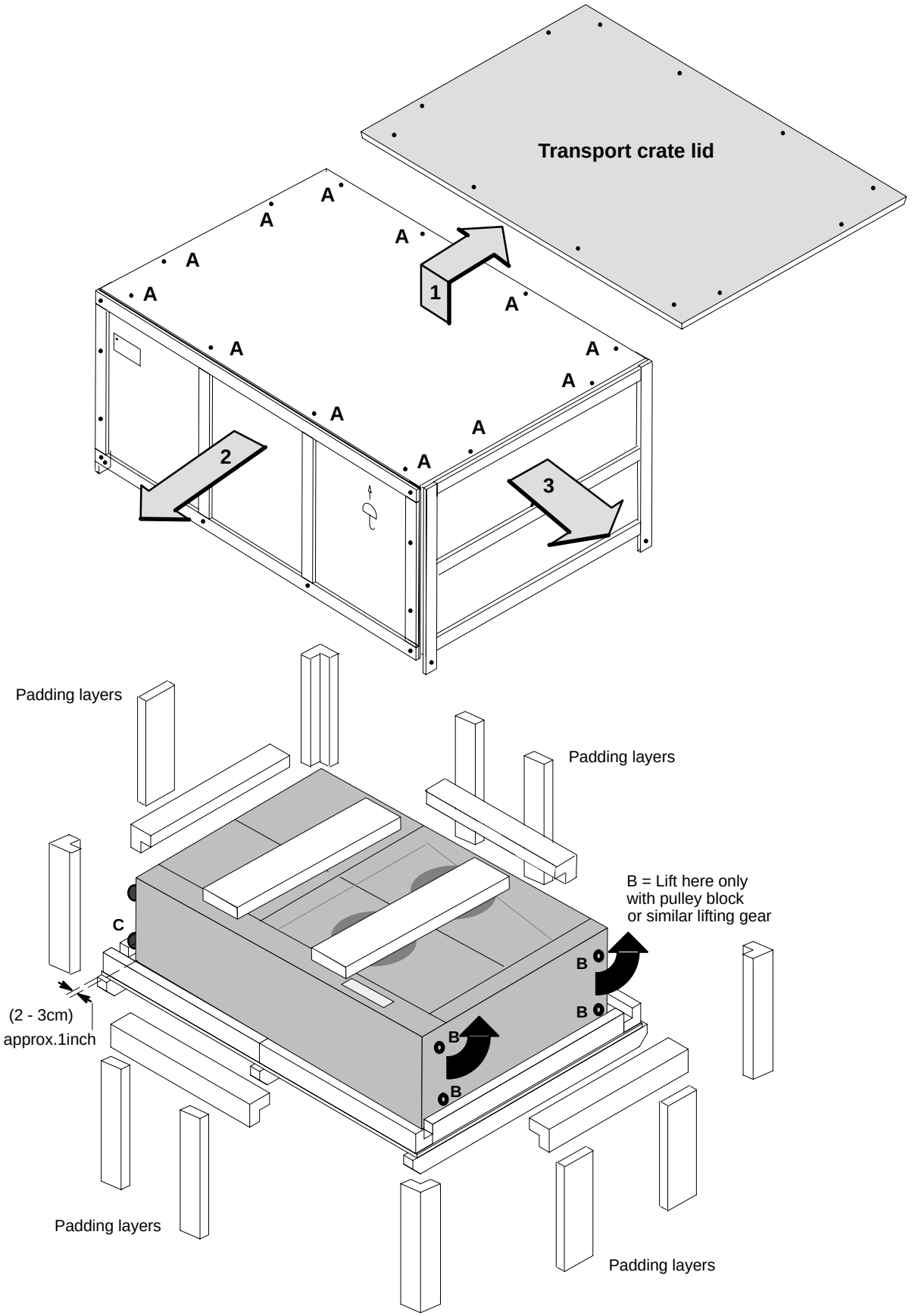


Fig. 401: Transport crate of the Shadow Telecine

Peak area load

Four threaded leveling feet are located in the corners of the bottom frame for final stationing. The feet have a diameter of 32 mm ∅ = 8 cm^2. This results in a **peak area load of < 178 lbs / sq. inch** or **< 12.5 kp / cm^2**.

Take care that the location is such that the ground loading is not exceeded.

ATTENTION!
Adjust Shadow Telecine in horizontal position with the threaded leveling feet.

These feet have to be unscrewed with an open wrench, size 17 mm to compensate the floor unevenness.

For transport, the feet were completely screwed in.

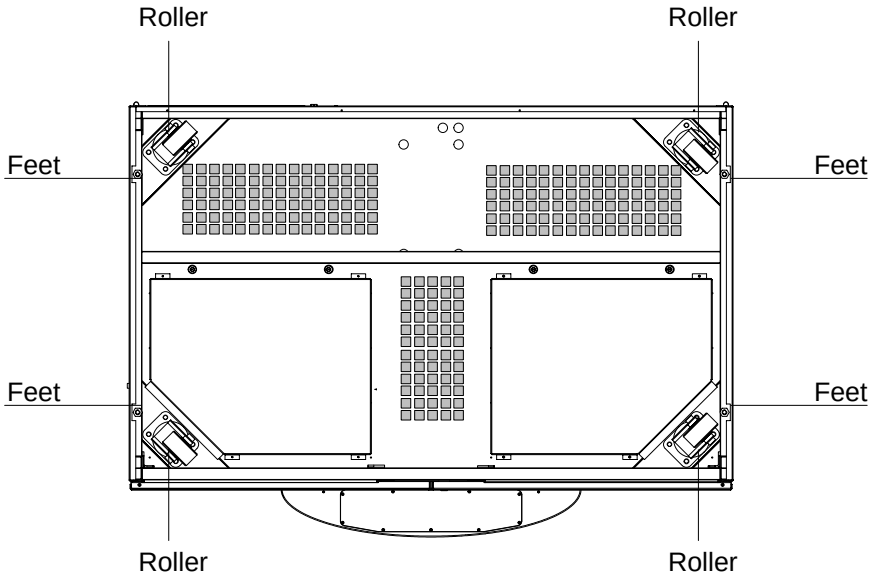


Fig. 402: Bottom view of the cabinet

Installation

Mount telecine unit on concrete or other non combustible surface only.

Keep packaging

Please keep the packaging. The Shadow Telecine **must only** be transported in this original packaging.

4.4 ACCESSORIES

The accessories are supplied separately in stable cardboard packages.

Check that all parts are delivered.

- **FH 4500 Local Control Panel**
- **Lens Gate Assembly (16 mm or 35 mm)**
- **Customer's Manual**
- **FH 4020 – Basic Accessories**
- **Set of condenser lenses and filters**
  Condenser lenses 1 & 2, infrared filter, heat absorbing filter, 3 dichroic filters for the filter wheel and halogen projection lamp.
- **Graphical Control Panel GCP1**
- **Options if requested**

4.5 SPACE REQUIREMENTS AND ENVIRONMENTAL CONDITIONS

Mechanical dimensions

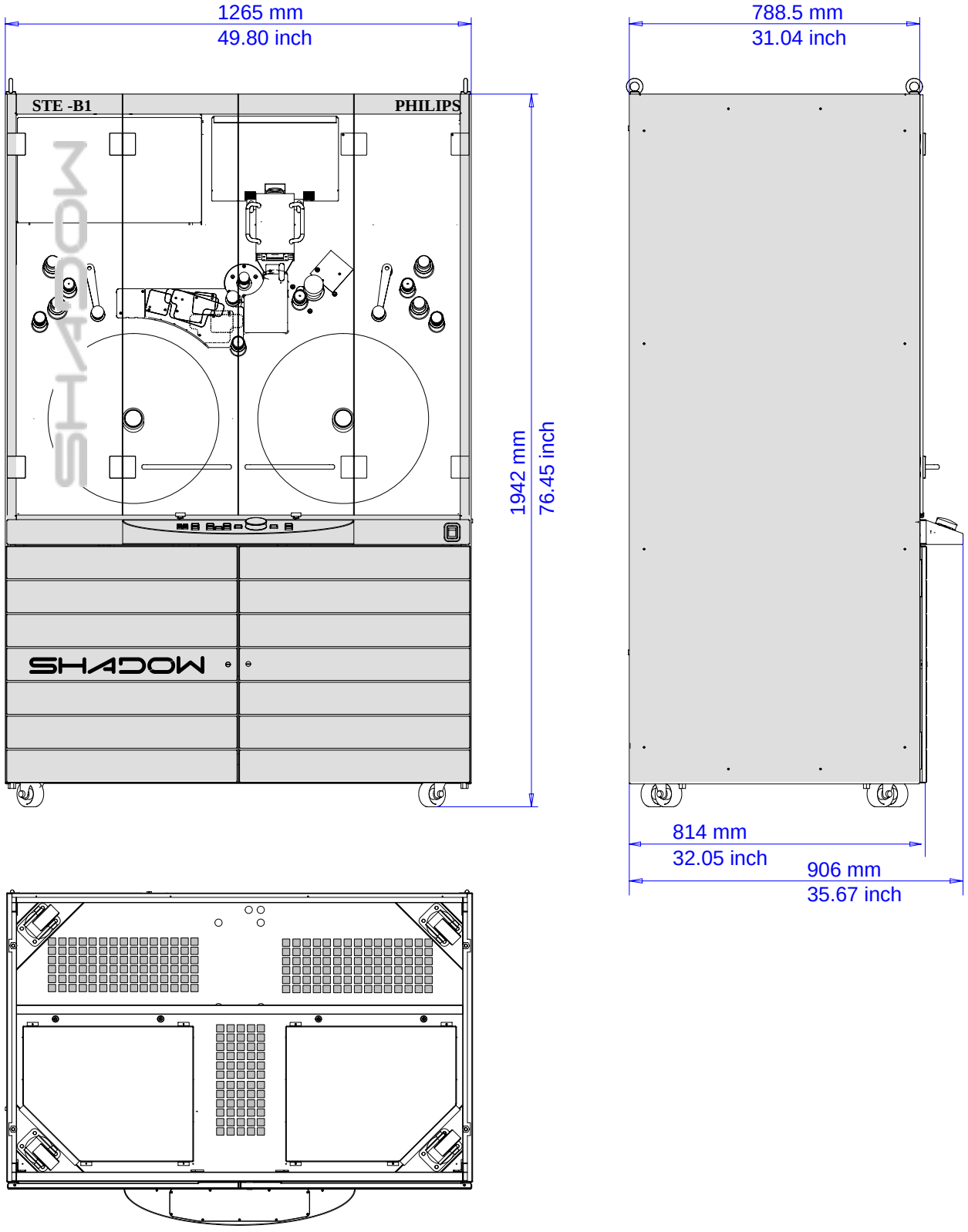


Fig. 403: Mechanical dimensions of the Shadow Telecine cabinet

Location

Space

The equipment has to be accessible both from the front and the rear side.

When installing the telecine unit, care should be taken not to cover the fresh air entries, see figure 404.

Ensure that the area is dustfree and the dust cannot enter through ventilation filters.

Operation temperature

The ambient temperature during operation must not exceed or fall below the range of +10^{o} C to +35^{o} C.

Air condition is required if the temperature exceeds 35^{o} C or if relative humidity is higher than 80%.

Optimum operation is at a temperature of +20^{o} C to +30^{o} C.

Ventilation

The ventilation air stream enters through openings in the bottom frame. Five bottom frame mats protect against dust.

The outgoing air leaves the cabinet from bottom to top. It is either led into the room or through openings on top of the cabinet to an air outlet system.

The required air throughput is 900 m^3/h (1200 cu. yd. / h) for 20° C ambient air temperature.

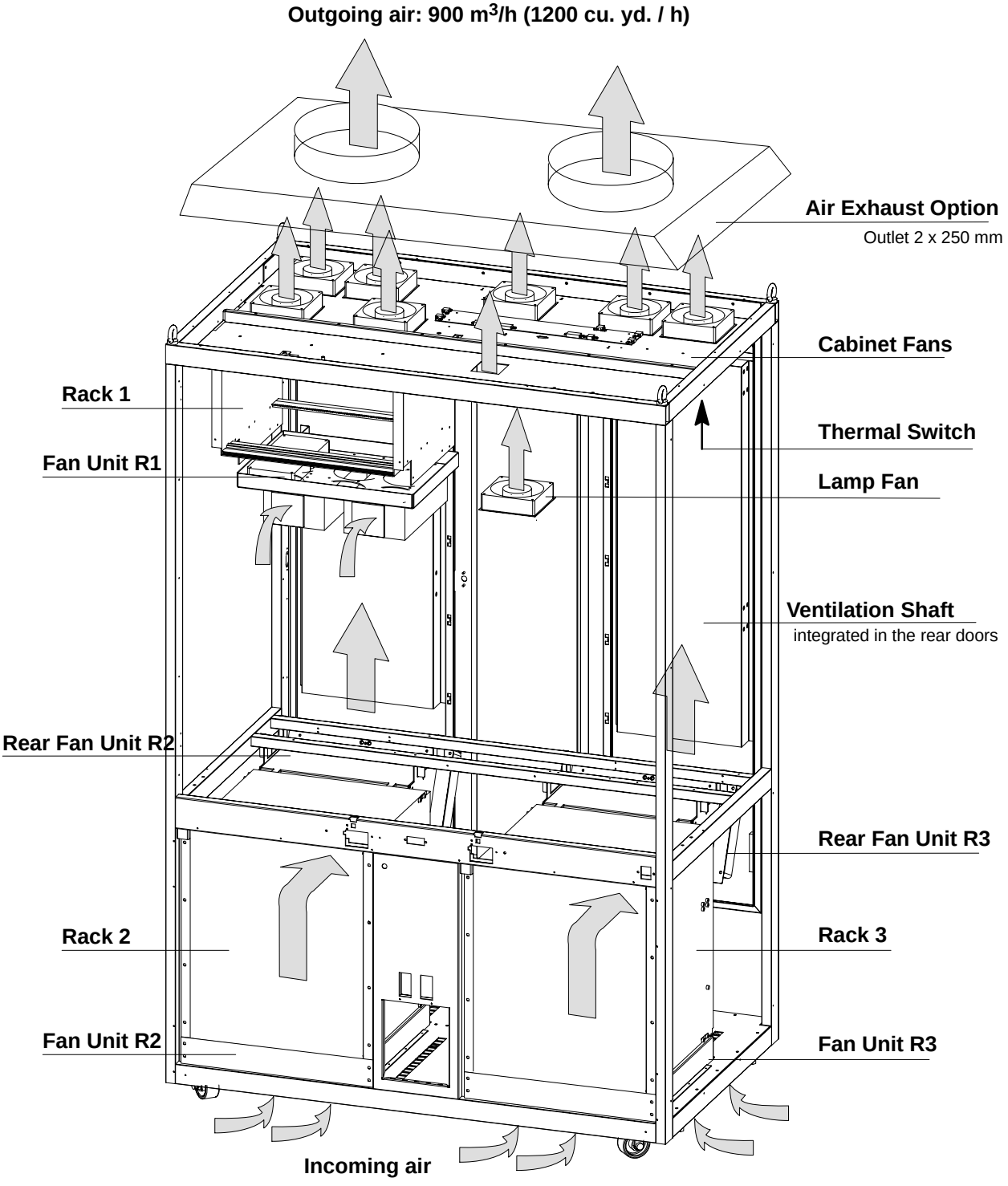


Fig. 404: Air ventilation system of the Shadow Telecine

4.6 REMOVAL OF STYROFOAM ELEMENTS

In order to protect the electronic devices in the rear of the Shadow, two foam elements are inserted.

- Open the rear doors of the cabinet
- Remove the elements

The foam element **1** stabilizes the Capstan Power Stage during transport. A foam element **2** stabilizes the Spooling Power Stage.

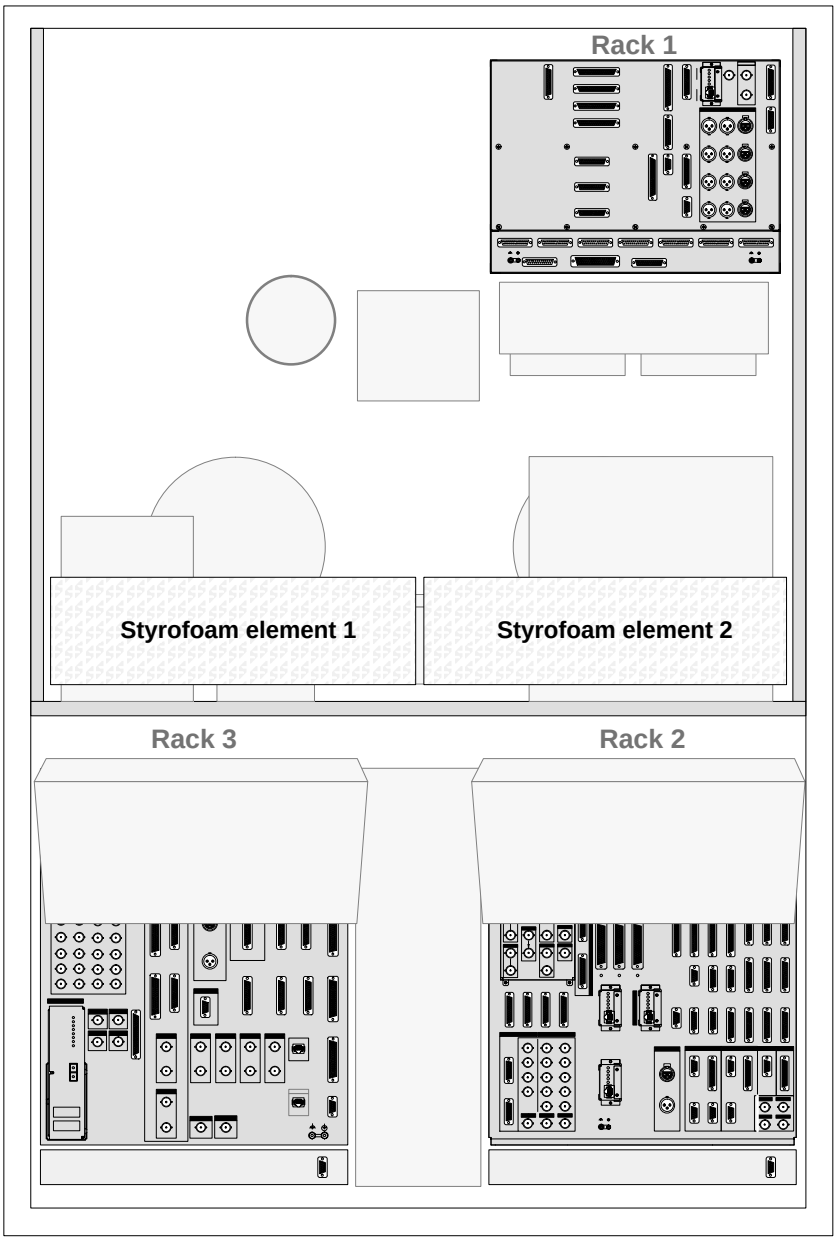


Fig. 405: **Telecine unit,** rear view

4.7 INSTALLING THE LOCAL CONTROL PANEL FH 4500

After having installed the equipment, mount the Local Control Panel FH 4500. Mounting and connection has to be performed as follows:

- Unpack the control panel.
- Insert the control panel with the guiding bolts into the two provided holes at the front mask of the equipment and press tightly (fig. 406).
- Doing so, the switch at the rear of the control panel locks automatically into the socket at the equipment.
- Fasten the control panel from below with the two threaded pins M4 using a 2mm hex socket-head wrench (fig. 407). For this procedure, the two lower doors of the cabinet have to be opened.



Fig. 406: Local Control Panel FH 4500

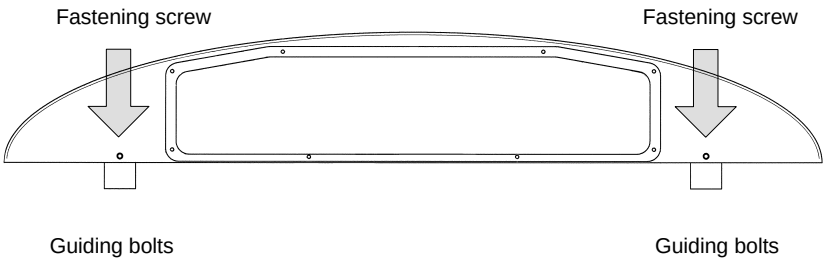


Fig. 407: Fastening screws of the Local Control Panel

Note: ***Should it happen, that due to a technical disturbance, the electronic door lock cannot be unlocked, it is possible to manually unlock the door lock, see section 3 Servicing, chapter 3.17 in the Service Manual.***

4.8 INSTALLING THE HANDLES AT THE FILMDECK FRONT DOORS

In order to protect the door handles for transport, the handles are mounted inside of the doors. After unpacking the unit, the door handles have to be mounted at the outside of the doors (fig. 409). Washers and screws are delivered with the handles.



Fig. 408: Front door handle of the film deck

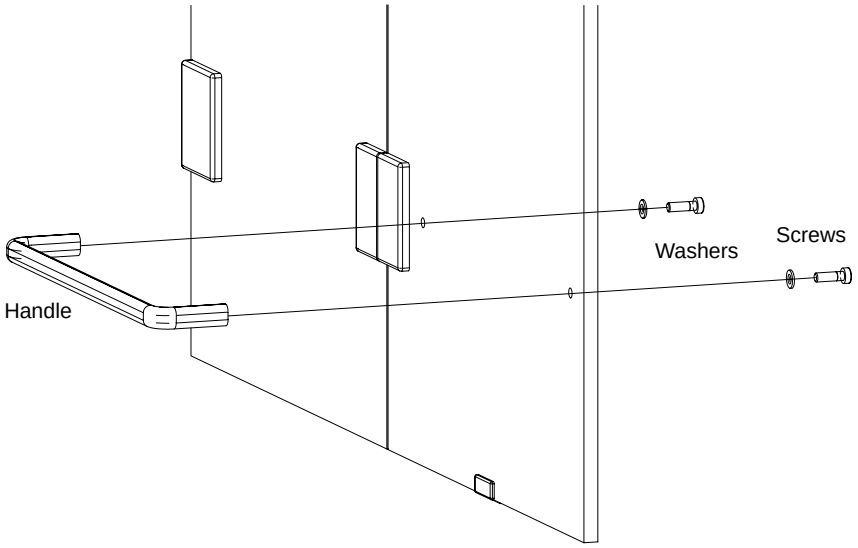


Fig. 409: Mounting the door handle

4.9 INSTALLING GRAPHICAL CONTROL PANEL GCP1

4.9.1 DESK MOUNTING

4.9.1.1 Fixed Desk Mounting

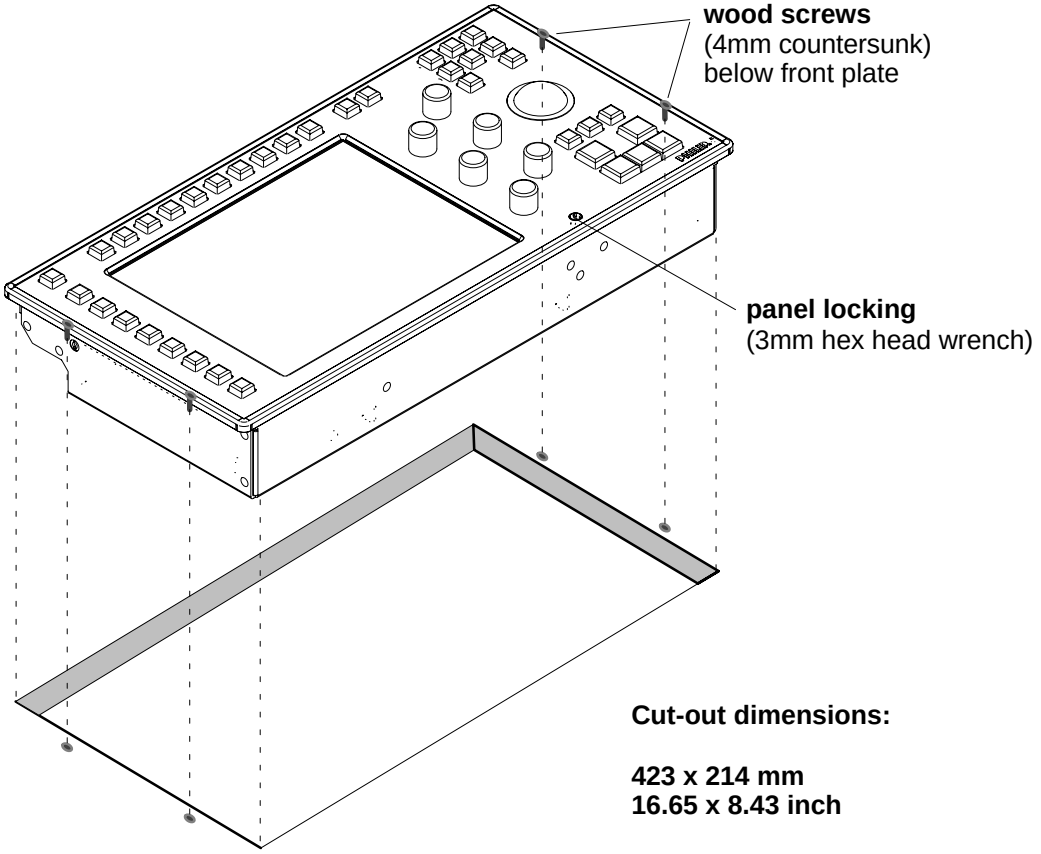


Fig. 410: Cut-out dimensions for the **fixed desk mounted GCP1**

- Before being mounted into a desk, the GCP1 has to be opened. For this purpose loosen the locking screw of the panel with a 3 mm hex head wrench. This tool is part of the accessory set.
- Cut-out the opening in the desk.
  Cut-out dimensions: 423 x 214 mm / 16.65 x 8.43 inch
- Set the opened GCP1 panel into the desk cut-out. Fasten the panel with four 4mm countersunk wood screws. For this purpose, the frame is provided with four screw holes. The length of the screw depends on the thickness of the desk plate. The wood screws will not be delivered.
  Note:
  Before fastening the panel make sure that the ventilation holes of the panel are not covered by the thickness of the desk plate. The ventilation of the panel must not be impeded in order to ensure sufficient cooling of the device and to guarantee an interference-free operation of the GCP1. Should the thickness of the plate be more than 10 mm, the underside of the desk plate has to be bevelled in the area of the ventilation holes (see Fig.412).
- Connect the cables into the corresponding plugs of the panel.
- The PE terminal on rear of the GCP1 panel (see Fig. ...) can be connected to a central earth system to prevent or eliminate EMC interferences.

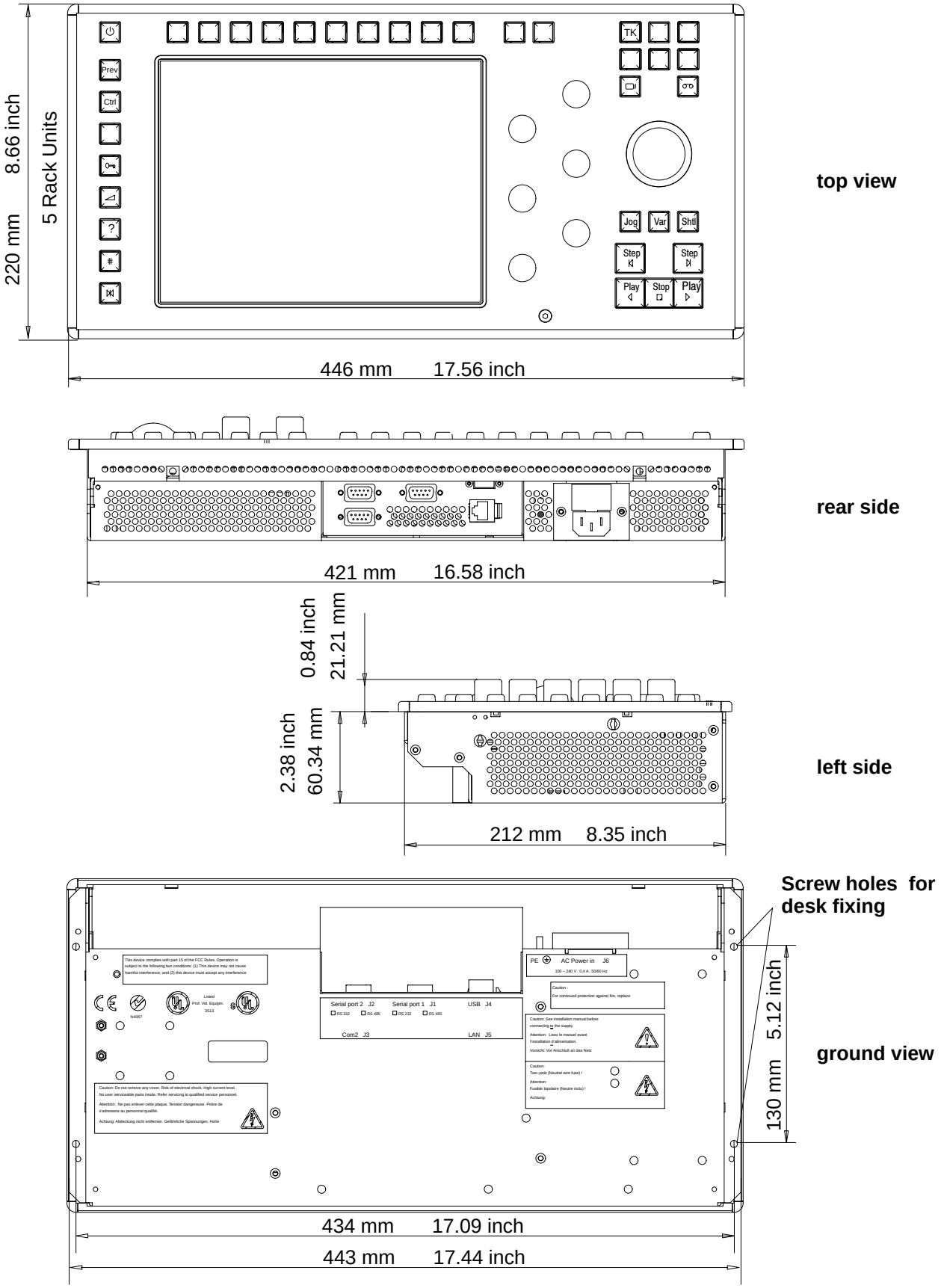


Fig. 411: Mechanical dimensions of the GCP1

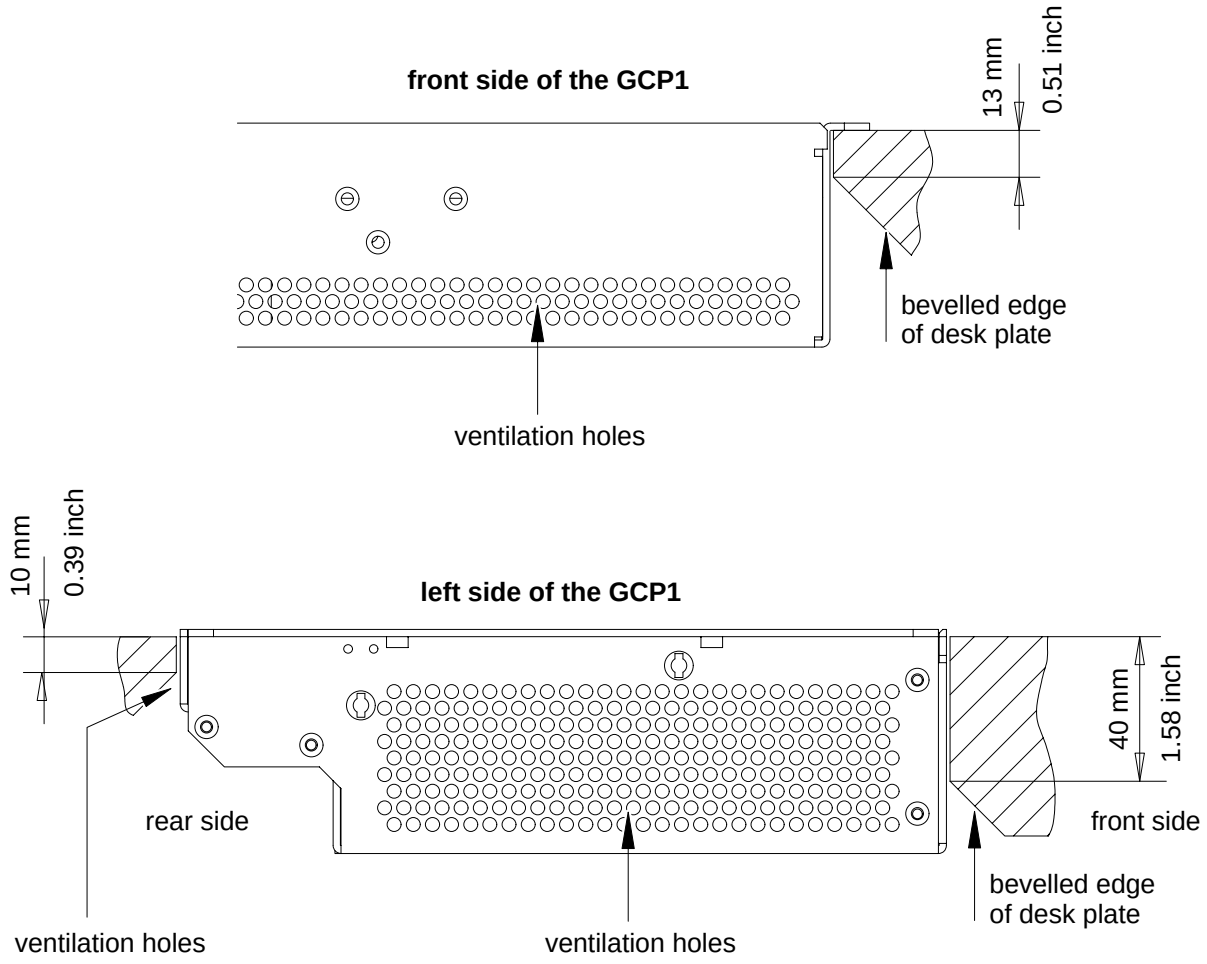


Fig. 412: Ventilation holes of the **GCP1**

4.9.1.2 Desk Mounting with Swivel Frame

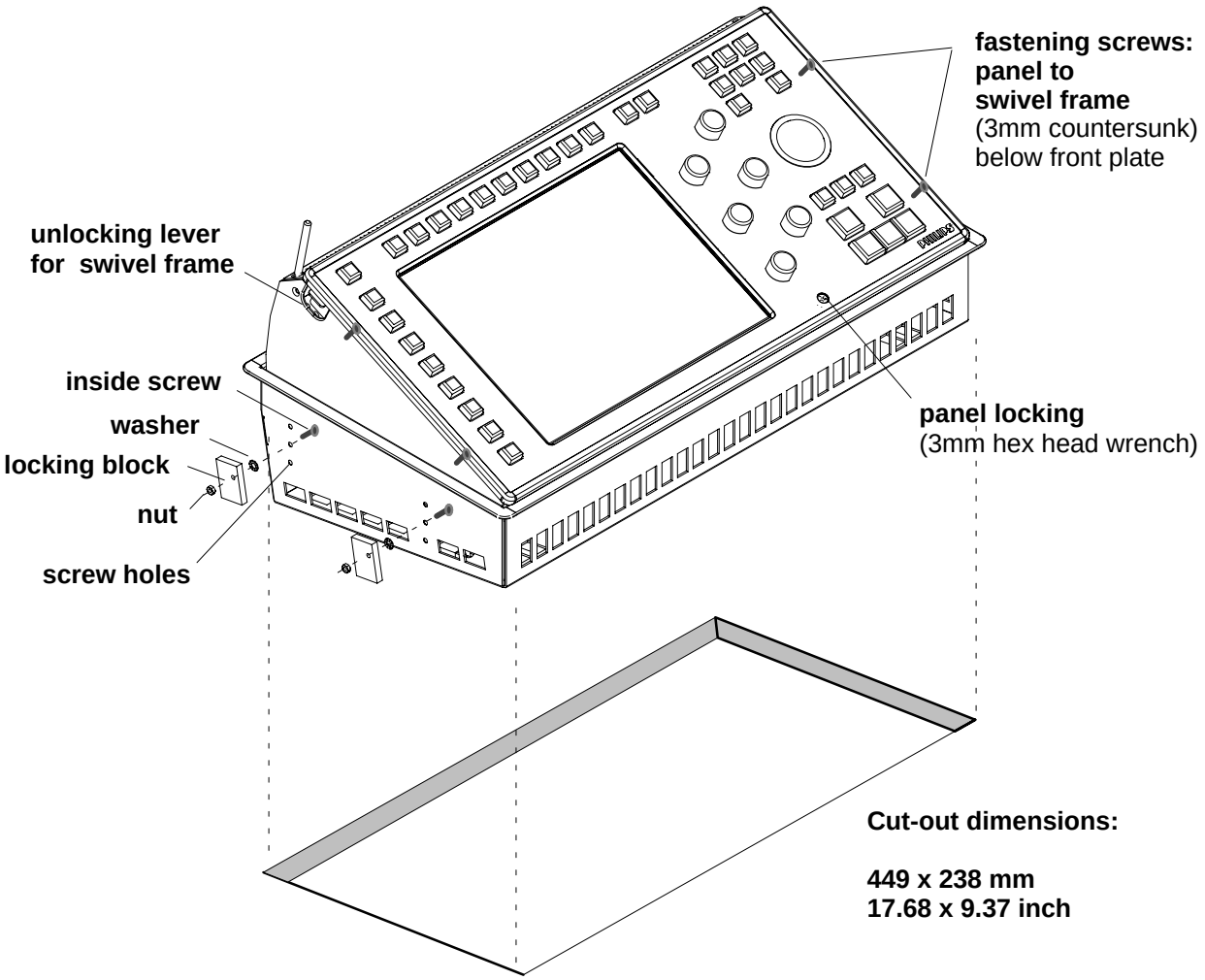


Fig. 413: Cut-out dimensions for the **GCP1 with desk mounting swivel frame**

- The swivel frame with mounted desk locking blocks and the GCP1 panel will be delivered separately.
- Cut-out the opening in the desk.
  Cut-out dimensions: 449 x 238 mm / 17.68 x 9.37 inch
- Swing out the swivel frame by pressing the unlocking levers and disassemble the four desk locking blocks.
- Set the swivel frame into the desk opening and fasten the four desk locking blocks below the desk plate in one of the three screw holes, depending on the thickness of the desk plate.

  Note:
  Before fastening the swivel frame make sure that the ventilation holes of the housing are not covered by the thickness of the desk plate. The ventilation of the housing must not be impeded in order to ensure sufficient cooling of the device and to guarantee an interference-free operation of the GCP1.
  Should the thickness of the plate be more than 35 mm, the underside of the desk plate has to be bevelled in the area of the ventilation holes.

- Insert the GCP1 panel into the swung on swivel frame and open the panel by loosen the locking screw of the panel.
- Fasten the panel to the swivel frame with the four 3 mm countersunk cross head screws; close and lock the panel.
- Swing out the GCP1 panel (with swivel frame), lead the cables from the cable feed-through via a loop to the corresponding plugs of the panel and fasten them with the cable traction relief (see Fig. 414).
  The cable loop should have a diameter of approx. 6 inch / 150 mm.
- The earth wire from the PE terminal of the swivel frame (see Fig. 414) has to be connected to the PE terminal on rear of the GCP1 panel (see Fig. ...).
  This PE terminal can be connected to a central earth system to prevent or eliminate EMC interferences.

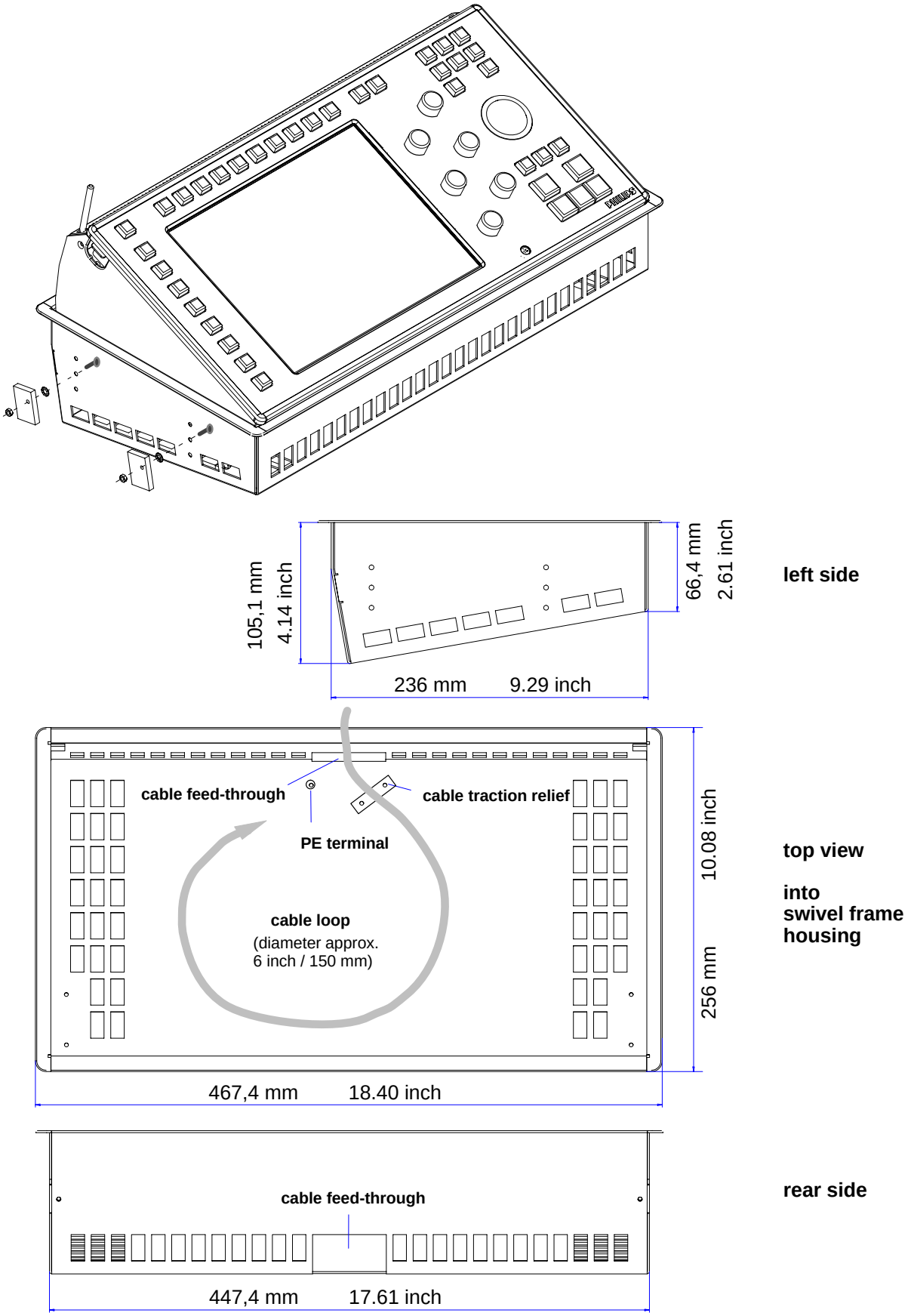


Fig. 414: Mechanical dimensions of **GCP1 with desk mounting swivel frame**

4.9.2 RACK MOUNTING

4.9.2.1 Fixed Rack Mounting

- For a fixed rack mounting of the GCP1 panel into a 19” cabinet a height of **5 RU’s (222 mm / 8.75 inch)** is required.
- Unlock the GCP1 panel with the 3 mm hex head wrench and open it.
- Fasten the rack mounting brackets to the frame of the GCP1. (The brackets and panel fastening screws are part of the accessory set).

Note: ***Before being mounted into the rack, the GCP1 has to be closed and locked with the 3 mm hex head wrench.***

- Mount the prepared GCP1 panel into the rack. The rack mount screws will not be delivered, because they are depending on the different rack types.
- Connect the cables to the corresponding plugs of the panel.
- The PE terminal on rear of the GCP1 panel (see Fig. ...) can be connected to a central earth system to prevent or eliminate EMC interferences.

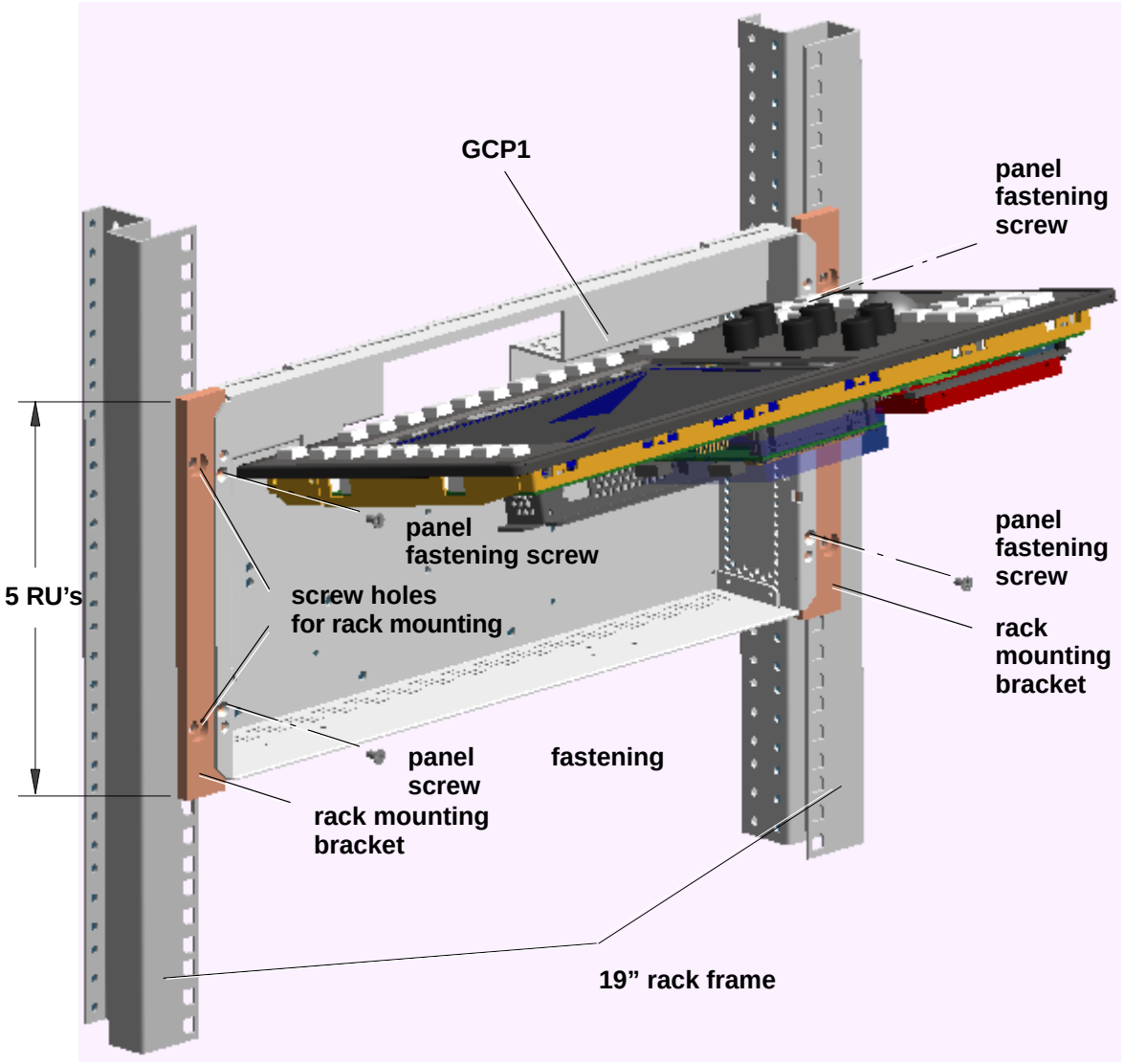


Fig. 415: **Fixed** rack mounting of the GCP1

4.9.2.2 Rack Mounting with Swivel Frame

- For a 19” rack mounting with swivel frame the GCP1 panel needs a built-in height of **3 RU’s (134 mm / 5.24 inch)** and a height of **5 RU’s (222 mm / 8.75 inch)** in swung-down (vertical) position.
- The components of the swivel frame will be delivered unmounted and separated from the GCP1 panel.
- The swivel frame has to be mounted into the rack first; then the GCP1 panel can be installed.
- **Rack mounting of the swivel frame:**
  Mount the left and right side traverse (assembled with telescope rail & swivel mechanism) into the rack.
  The rack mount screws will not be delivered, because they are depending on the different rack types.
  Mount the rear traverse to the left and right side traverse with the four 3 mm countersunk cross head screws from above.
  Mount the front traverse to the left and right telescope rail with the four 3 mm countersunk cross head screws from below.
  Pull out the left and right telescope rail by pressing the unlocking levers.
  Mount the front plate of the swivel frame with four 3 mm countersunk cross head screws at the left and right side.
- **Installation of GCP1 panel:**
  Pull out the swivel frame and position it horizontal by pressing the unlocking levers.
  Insert the GCP1 panel into the swivel frame.
  Loosen the panel locking screw with the 3 mm hex head wrench and open it.
  Fasten the panel to the swivel frame with the four 3 mm countersunk cross head screws.
- Lead the cables from the rear side of the rack through the cable holders via a first loop (long enough to plug in and out the GCP) to the swivel frame.
  Lead the cables within the swivel frame via a second loop (diameter approx. 6 inch / 150 mm) to the corresponding plugs of the panel and fasten them with the cable traction relief (see Fig. 414).
- The earth wire from the PE terminal of the swivel frame (see Fig. 414) has to be connected to the PE terminal on rear of the GCP1 panel (see Fig. ...).
  This PE terminal can be connected to a central earth system to prevent or eliminate EMC interferences.

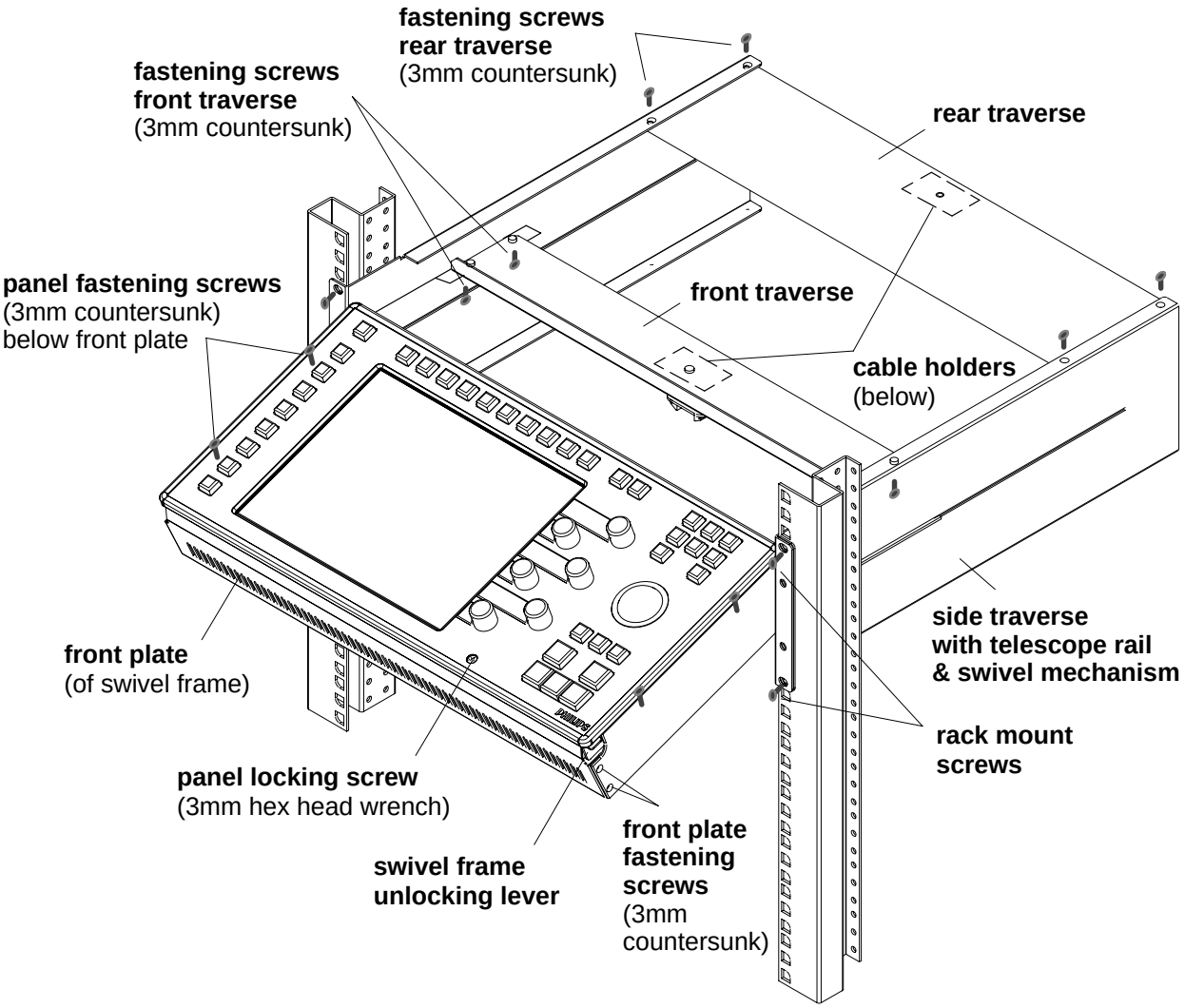


Fig. 416: Rack mounting of the **GCP1 with swivel frame**

4.9.3 CONNECTING TO THE SHADOW TELECINE

Attention: ***The EMC regulations require the use of properly shielded cables in the installation of the device or the system. Suitable cables can be ordered from Thomson.***

For the control connection between the Shadow Telecine and the GCP1, the RJ45 patch cable, supplied with the GCP1 has to be connected from the rear RJ45 terminal panel of the Shadow to the LAN connector J5 of the GCP1.

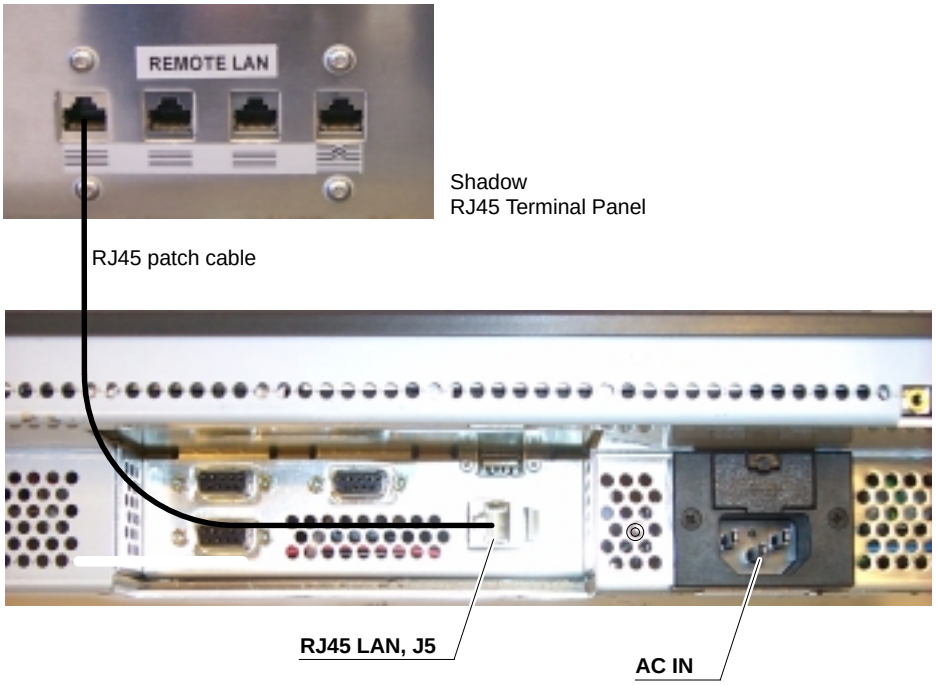


Fig. 417: Power and control connectors

PE

The housing of the GCP1 panel is connected to protective earth (PE).

The panel has a PE terminal on rear. This PE terminal can be connected to a central earth system to prevent or eliminate EMC interferences.

4.10 CONNECTING OF AN EXTERNAL GATEBLAST AIR COMPRESSOR

Gateblast unit

An integrated gateblast unit, consisting of a pressure reducer, 3 µm air filter and magnetic valve, keeps the light gap and the integrations cylinder of the film gate dustfree.

An external air compressor with the following features

- 2.5 ... 7.5 bar = 35 ... 107 lb /sq. inch
- Pre-filtered air (max 40 µm)
- Dry air, less than 80 % relative air humidity
- Oil-free

and a high pressure hose is additionally required.

Connection of an external air compressor

Connect the external air compressor as follows (see figures 418 and 419):

- Connect an 1/4 inch (8 mm) air hose to the appropriate air connector (figure 418) at the cabinet rear bottom left hand side.

  Attention!
  Use only high pressure hose > 7.5 bar = 107 lb /sq. inch.

- Secure air hose with a circular clip on the connector (figure 418)
- Adapt air hose to the air compressor (figure 418)
- Check the correct air pressure **0.6 ba**r or **8 lb / sq. inch** (nominal value with pressure reducer in the air hose) of the pressure reducer figure 419 when the telecine is in PLAY mode.

If the telecine is in STOP, switched off or when mains failure occurs, the magnetic valve of the gateblast unit switches off the air supply.

The required air flow amounts to 60 l / min.

Attention! Check your compressor regulary!

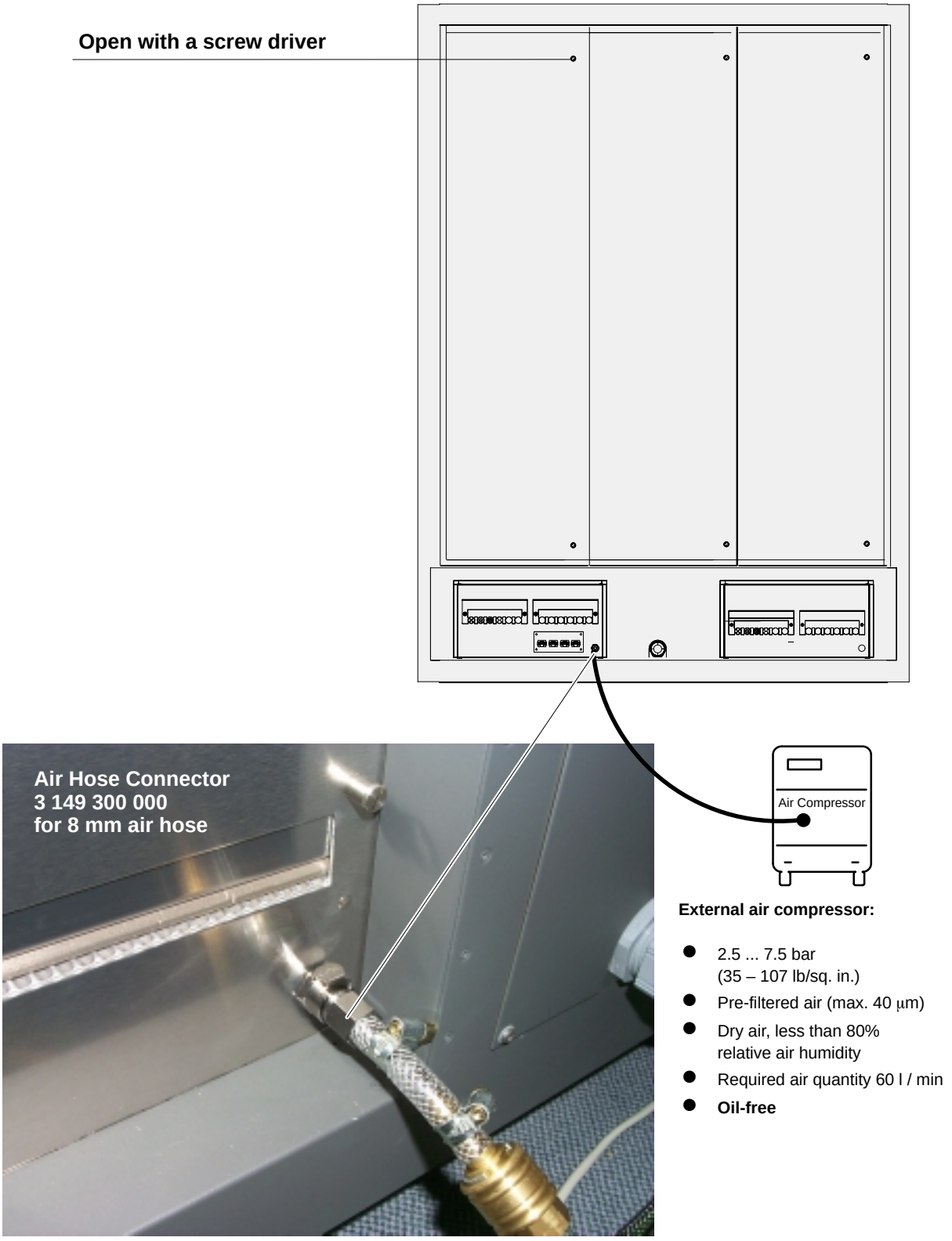


Fig. 418: Rear side of the telecine unit with air connector terminal panel



Pressure reducer

Air pressure:
0.6 bar (8 lb/sq. inch)

Air filter 3 µm
with water collector

Air filter is included in the
Filter & Battery Set
2 128 102 142

Fig. 419: Gateblast unit of the Shadow Telecine

Attention! **Change the air filter and empty the water collector regulary!**

4.11 MOUNTING LENSES AND FILTERS

Before switching-on the telecine, various condensor lenses and filters has to be mounted in the lamp house of the unit. The projection lamp is already mounted.

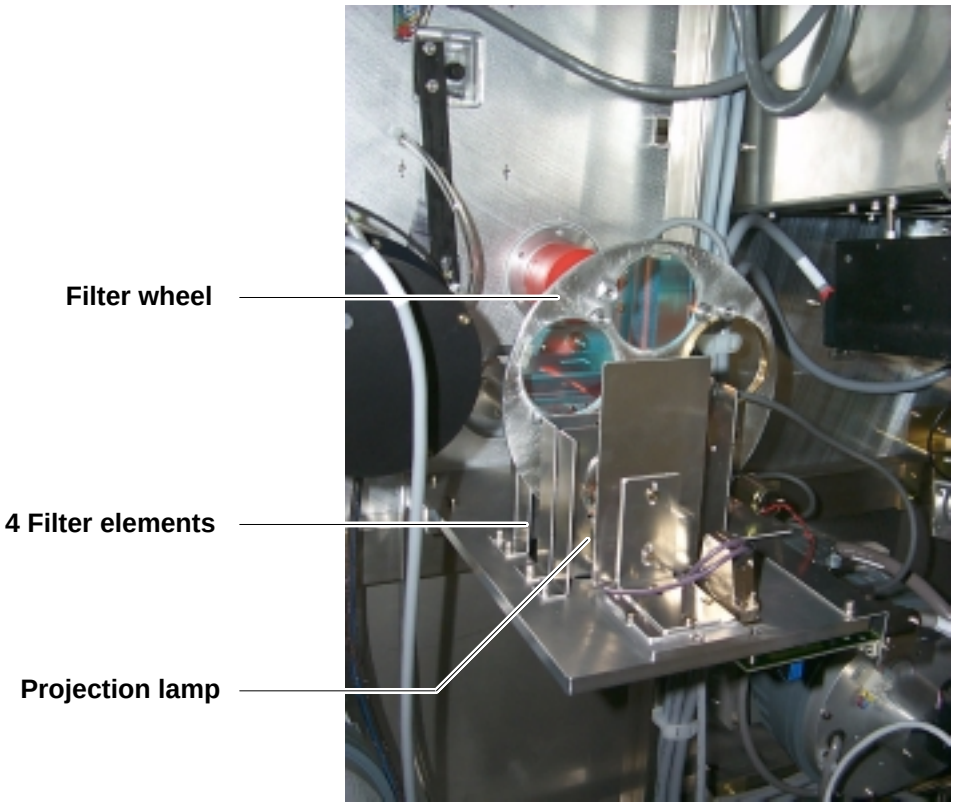


Fig. 420: Lamp house with complete mounted filters

To install lenses and filters open the rear doors of the telecine unit.

The carriers for lenses and filters are accessible from the cabinet rear and located approximately at the middle of the film deck plate.

To protect the optical elements against dirt and finger prints while inserting, always wear thin cotton gloves or use a piece of optical cleaning cloth to grasp them.

The lenses and filters had been packed in clean condition. In exceptional case, if necessary, clean the parts with optical cleaning cloth, order no.: 5 001 310 280, that has been moistened with isopropyl alcohol.

4.11.1 INSERT FOUR DICHROIC FILTERS INTO THE FILTER WHEEL

- Release the filter wheel by pushing down the motor.
- Revolve the filter wheel that a filter opening stands upside.
- Move the two fastening brackets of the filter to the side.
  Note the mounting position notation at the filter opening and at the dichroic filter (noted at one small edge): **NEG, PT/IMED** or **CAL** or the filter order numbers.
- Insert the respective filter.
- The fastening brackets have to lock in by turnig.

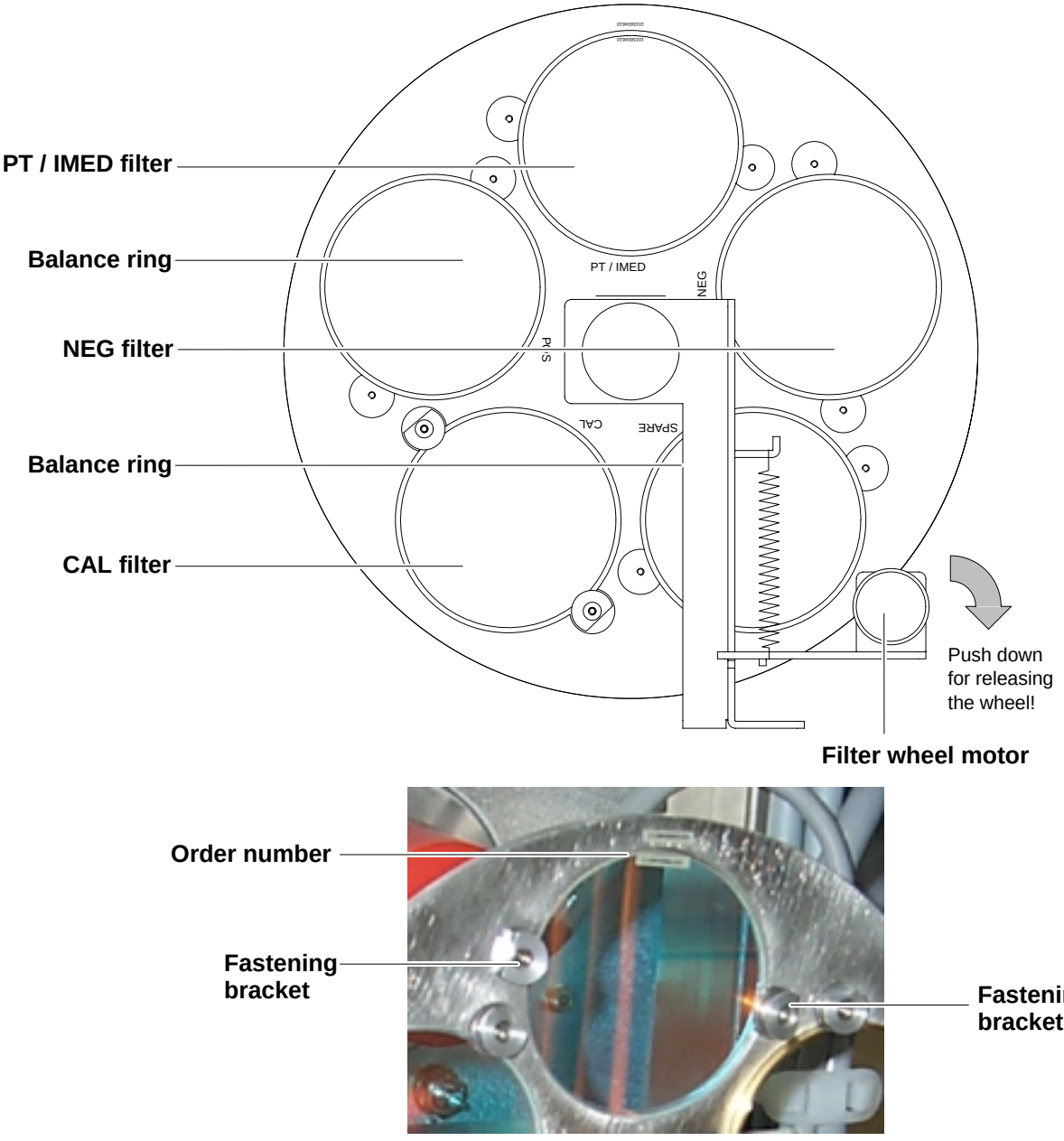


Fig. 421: Insertion of the filter into the filter wheel

4.11.2 INSERT FOUR FILTER ELEMENTS

After unpacking, clean the filter or lens elements and mount them at their respective positions before or behind the filter wheel (Fig. 422).
To avoid mounting the elements at a wrong place, the base plate is provided with encoding pins (Fig. 423). The filter elements have corresponding grooves. Thus, wrong mounting is not possible.

Fasten each element with two M4 screws using a 2mm hex socket-head wrench.

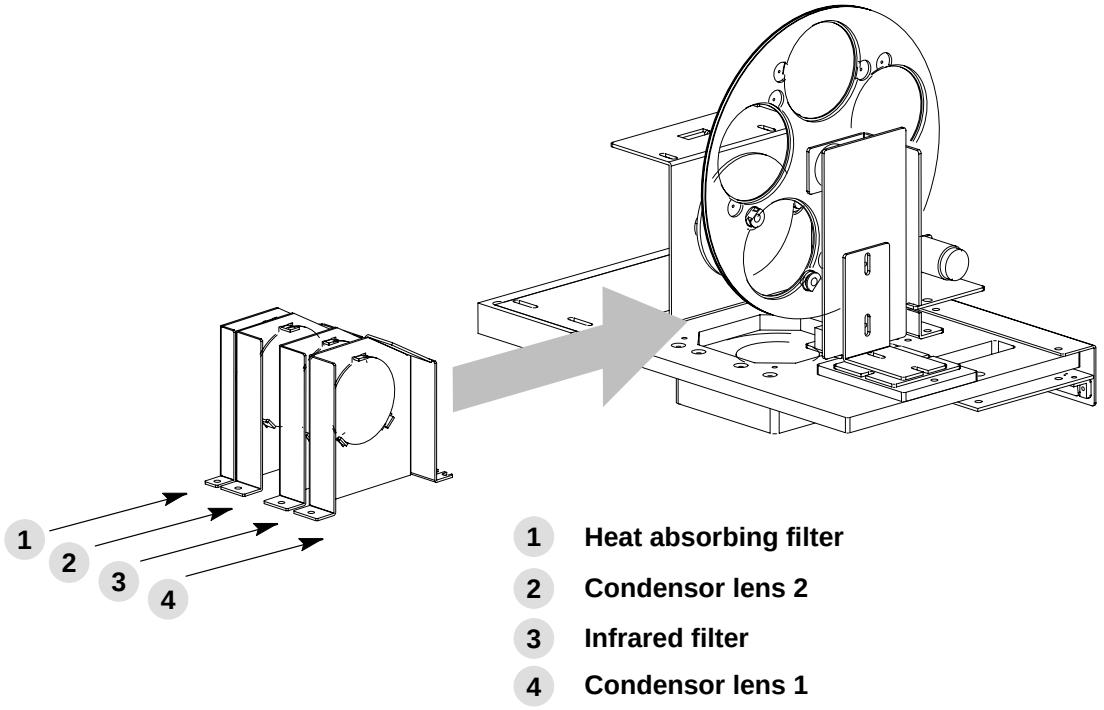


Fig. 422: Mounting the four filter elements

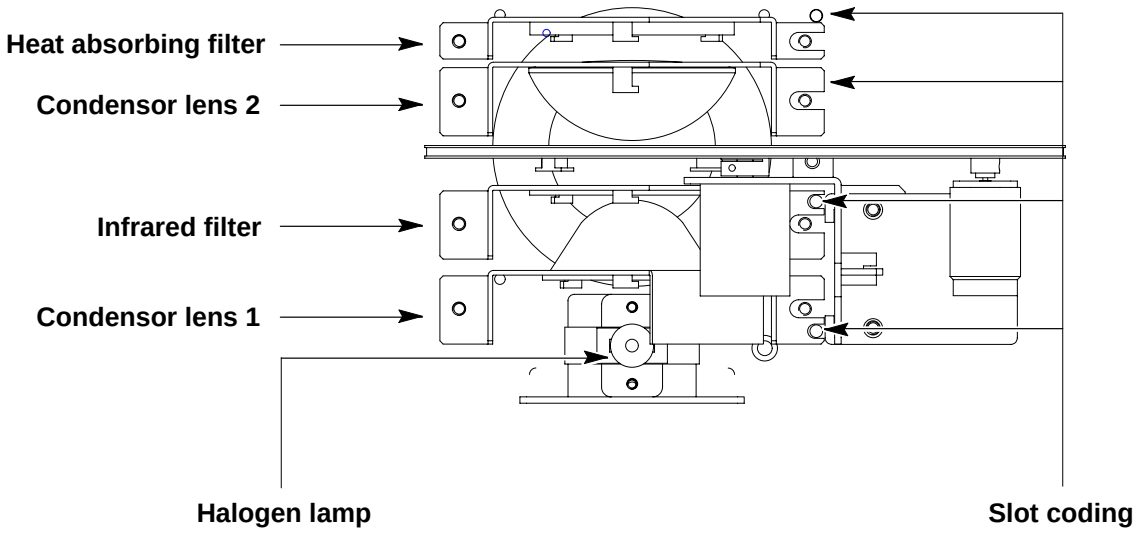


Fig. 423: Slot coding

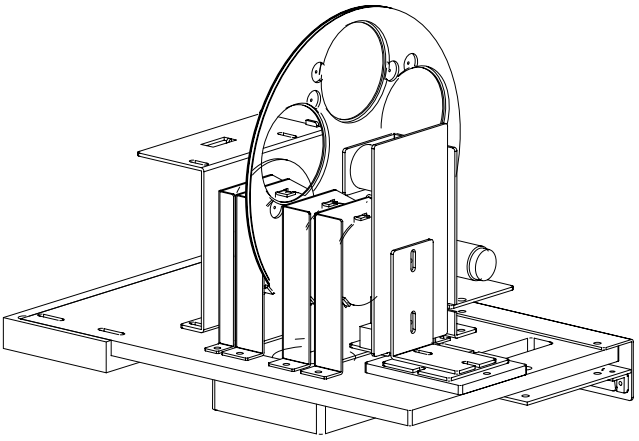


Fig. 424: Mounted filter elements

4.12 INSTALLING LENS GATE ASSEMBLY (LGA)

Installing the appropriate LGA (16mm or 35mm) matches the telecine to the respective film format optically.

1. Turn the locking lever to the unlocked position.
2. Grasp the LGA by the two handles and set the unit on the guide pins and slide it slowly towards the film deck plate until it fits.

Attention! ***Do not cant the lens gate assembly while sliding it in to avoid damaging the light sensor!***

3. Lock the lever .

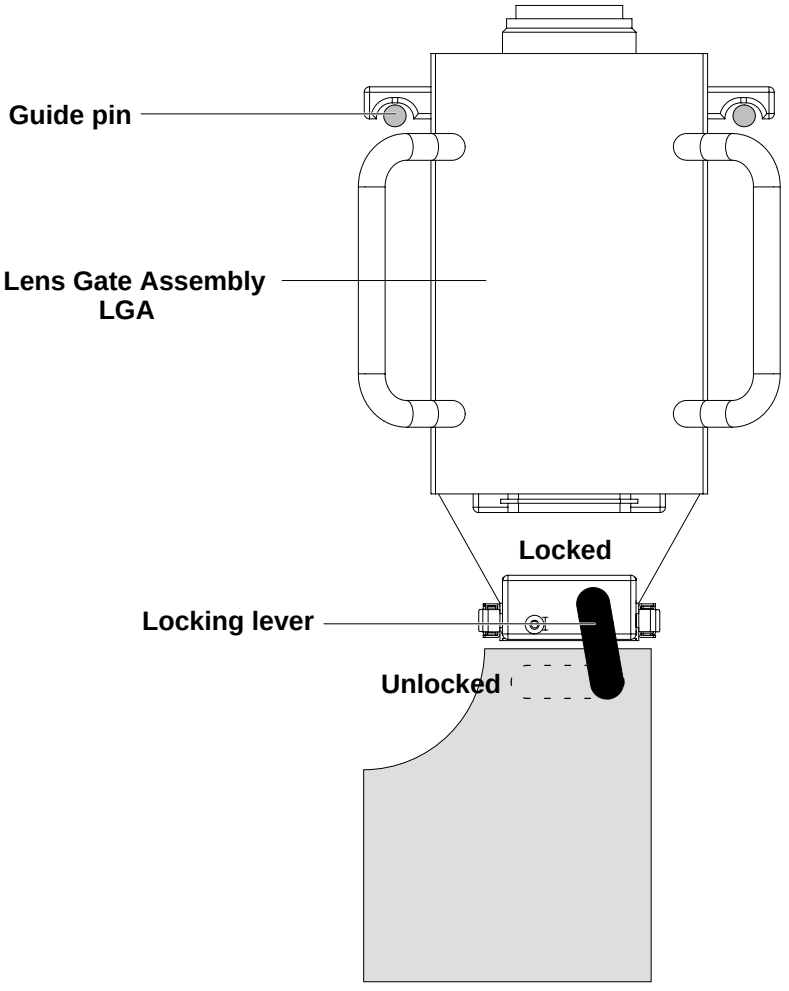


Fig. 425: Installing the Lens Gate Assembly

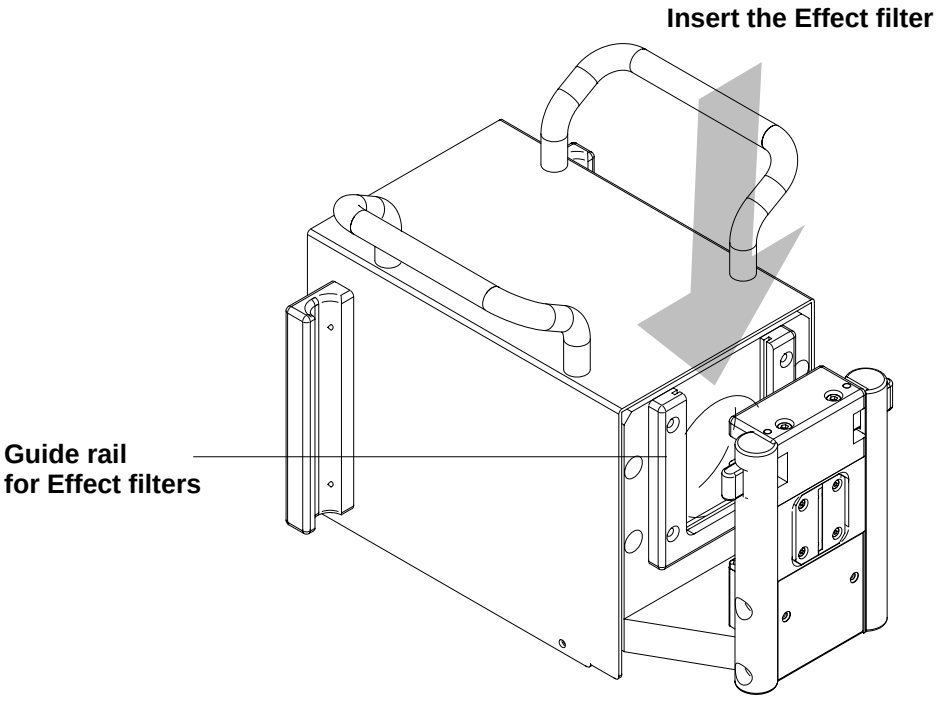


Fig. 426: Inserting the Effect filters

4.13 MAINS CONNECTION GENERAL

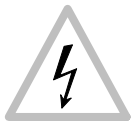
4.13.1 SAFETY INSTRUCTIONS



Mains installation **must** only be done by qualified personnel!

Power supply in excess of 40 volts are potentially hazards or lethal.

At no time should contact be made with the machine wiring or terminals, except via a probe with appropriate insulating properties.



Opening covers or removing assemblies except for those which can be actuated by hand (without using tools) may give access to live components or parts. Therefore, disconnect the Shadow Telecine from the AC power before beginning any repair works or before exchanging any parts.



CAUTION !

Disconnect power cord
before removing covers!
Parts of this unit are still at
mains voltage in ”OFF”-condition!

No operator serviceable parts inside. Refer servicing to qualified personnel!

Capacitors may still carry a residual charge!



In cases it is unavoidable to carry out repair works on the telecine unit while it is powered, this should be done only by qualified personnel being informed about the dangers involved, and only after having taken the necessary preventive measures.

If it can be taken for granted that due to a damage, safe operation of the telecine unit is no longer possible, put the unit out of operation and make sure that it cannot be switched on again.

Plug-in units

For safety reasons, all plug-in units should only be operated in the built-in condition.

4.13.2 GENERAL REMARKS CONCERNING COMMISSIONING AND AC POWER SUPPLY

The Shadow Telecine and the several units are constructed in conformity with the VDE safety regulations EN 60950 (VDE 0805), protection class 1 and UL 1419 and are in unobjectionable condition when leaving the factory.

In order to maintain this condition and to ensure safe operation, the following points have to be observed:

Mains voltage check

The telecine unit is delivered for operation on the required mains voltage. This voltage is marked on the type label at the rear of the cabinet and should be checked against the actual studio mains voltage before switching on the equipment.

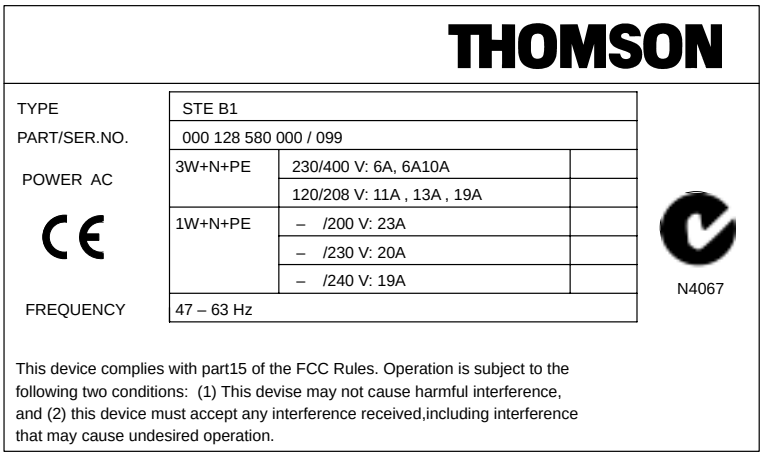


Fig. 427: Type label of Shadow Telecine

3-phase mains connection

3 * 400V, 50Hz, three-phase current, 230V mains
3 * 208V, 60Hz, three-phase current, 120V mains
Class 1 wiring applicable

1-phase mains connection

1 * 230V, 50Hz, one-phase current, 230V mains

2-phase mains connection

phase to phase 208V, 60Hz, 120V mains

Power consumption

approx. 5 kVA

Earthing

wiring regulations according to VDE 0800/part 2,
VDE 100/part 540,
IEC 364–5–54, IEC 364–4–41, NEC Code ANSI/NFPA
or the applicable national regulations.

Fuses

When changing fuses, it is mandatory to use only UL-fuse links of same type and current rating as a replacement. Using mended fuses or shorting the fuse holder is not permissible.

Mains voltage change

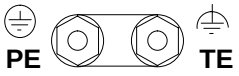
When connecting this telecine unit to another mains voltage, the fuses in the subunits have to be checked or exchanged. For details see chapter 4.15 .

Opening covers or removing assemblies except for those which can be actuated by hand (without using tools) may give access to live components or parts. Therefore, disconnect the telecine from the AC power before beginning any repair works or before exchanging any parts.

Ventilation

For ventilating the telecine cabinet, four blower units are mounted in different plane surfaces. When installing the Shadow Telecine, care should be taken to allow for adequate aircirculation.
In addition, several subunits are equipped with their own blowers.
For the blowers no change of the supply voltage has to be executed.

4.13.3 EARTHING REQUIREMENTS



Earthing instructions:

1. Earthing with the protective earth has to be executed with the power cord which contains the earthed protective conductor **PE** (normally).
   The earth conductor has to be connected to the **PE** screw terminal within the line filter!
2. The additional protective earth has to be connected to the central **PE** screw at the power terminal unit as earth conductor with large cross section!
3. The jumper **TE –– PE** must not be broken!
4. The earth connection has to be made **before** connecting the power cord!



CAUTION! GROUNDING CIRCUIT CONTINUITY IS VITAL FOR SAVE OPERATION OF MACHINE. NEVER OPERATE MACHINE WITH GROUNDING CONDUCTOR DISCONNECTED

ATTENTION! UN CIRCUIT DE TERRE CONTINU EST ESSENTIEL EN VUE DU FONCTIONNEMENT SECURITAIRE DE L'APPAREIL. NE JAMAIS METRE L'APPAREIL EN MARCHE LORSQUE LE CONDUCTEUR DE MISE A LA TERRE EST DEBRANCHE

Protective earthing



Earthing of the telecine unit serves the product safety and meets the requirements in conformity with safety class I.
The Shadow Telecine is connected with the protective earth of the power supply circuit (e.g. the studio) by means of the power cord which also contains the earthed protective conductor **PE** (see also chapters 4.13.6 "Required cross sections for the power cords" and 4.14 "Installation of the power cord").
Precondition is an earthed and checked mains connection!
The protective earth conductor of the power cord **always** has to be connected to the **PE** screw terminal within the line filter. This **PE** screw terminal is internally connected with the parts to be earthed, e.g. the cases.
The effect of the protective earth connection must not be cancelled through the use of an extension cord without protective earth conductor, through an excessively long cable, nor must its function be disabled in any other way!

High Leakage Current

Due to its high leakage current (> 3.5mA), the telecine unit **must** be connected with an additional earth conductor of 6mm^2.

Additional Earth Conductor UL 1419

An insulated earthing conductor that is identical in size, insulation material, and thickness to the earthed and unearthed branch circuit supply conductors except that it is green with or without one or more yellow stripes is to be installed as part of the branch circuit that supplies the unit or system.

For more details see chapter "Required cross sections for the mains / earth cables".

Make the earth connection with the additional earth conductor to the central **PE** screw at the power terminal unit always **before** applying mains power!

For this purpose, the line filter also carries the following warning note:

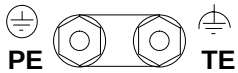
CAUTION !
HIGH LEAKAGE CURRENT
Earth connection essential
before connecting supply

Connecting to Service Equipment UL 1419

The earthing conductor described is to be connected to earth at the service equipment or, if supplied by a separately derived system, at the supply transformer or motor generator set.

Earthed Plug Receptacles UL 1419

The attachment-plug receptacles in the vicinity of the unit or system have all to be of an earthing type, and the earthing conductors serving these receptacles are to be connected to earth at the service equipment.



The telecine unit is provided with two separate terminals for connecting protective earth **PE** and technical earth **TE** (e.g. video earth) at the power terminal unit.
On delivery, these terminals are joined by a short-circuit jumper.
The jumper **TE –– PE** must not be broken!

For using the **TE** terminal it is necessary to consult Thomson.

The **PE** terminal, marked by the symbol ⏚ 417-IEC-5017 (protective earth), is internally connected with the **PE** terminal of the line filter and the metal case parts.

TN-C power systems

In case of TN-C power systems (combination of neutral conductor and protective conductor), it is necessary to observe the regulations in conformity with IEC 364-5-54 (VDE 0100 T.540) and IEC 364-4-41, IEC 364-4-47 (VDE 0100 T.410) or the applicable national regulations.

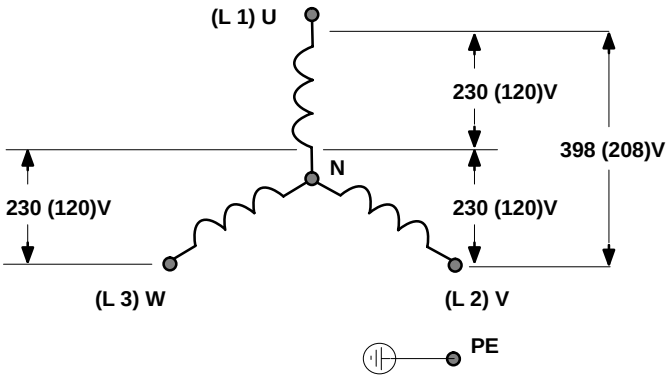
Any break of the protective earth conductor inside or outside the telecine or disconnection of the protective conductor connector may entail that, in the event of a failure, the operational safety of the device will no longer be ensured!
All mains sockets of devices being interconnected with signal cables have to be checked. The protective earth conductors must not be live!

Abbreviations: (In conformity with DIN 42 400 or IEC Publication 445)

FPE	=	functional protective earth
L	=	line, outer conductor (phase, R, S, T)
N	=	neutral conductor
PE	=	protective earth conductor (earlier designation: PROTECT GND) color code of the PE wire: green/yellow
TE	=	technical earth = functional noiseless earth (video earth, audio earth with protective earth qualities color code of the TE wire: black
IEC	=	International Electrotechnical Commission
VDE	=	Association of German electrical technicians and electrical engineers
DIN	=	German industrial standards
UL	=	Underwriters Laboratories

4.13.4 MAINS SYSTEMS (POWER TYPES)

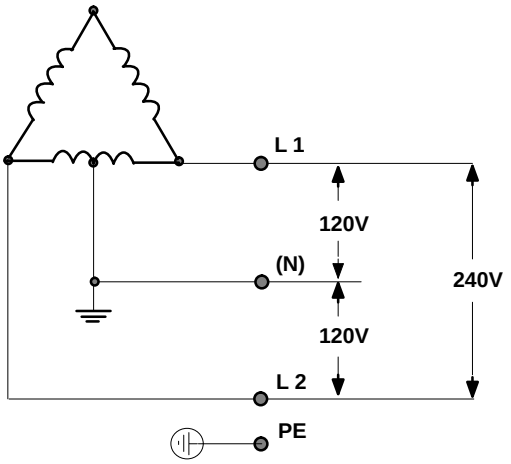
4.13.4.1 Mains System from Europe and USA



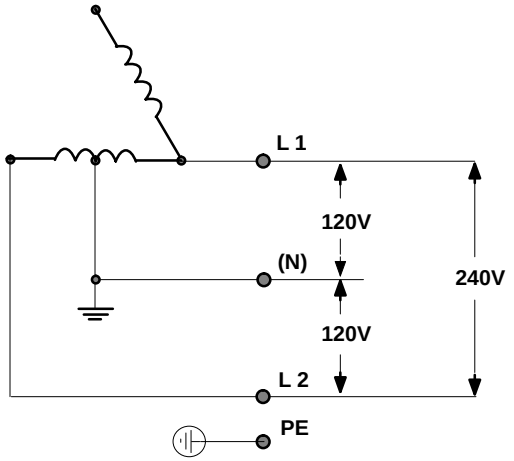
Three-phase current, star connection, four-wire, earthed neutral

4.13.4.2 Mains System from USA and South-East (Asia, Japan)

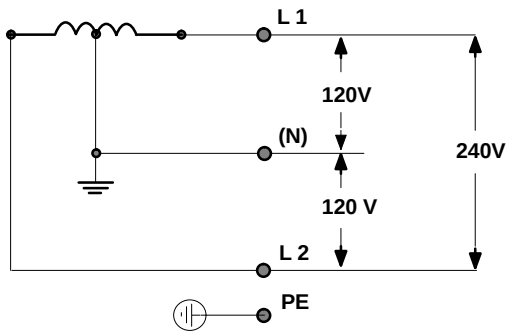
Three-phase current, delta connection, four-wire, earthed midpoint of phase;
= two-phase connection 240Vac; N is not connected to the telecine.



Three-phase current, open delta connection, four-wire, earthed midpoint of phase;
= two-phase connection 240V (200V); N is not connected to the telecine.



Single-phase (two-phase) current, three-wire, earthed midpoint;
N is not connected to the telecine.



4.13.5 AN EASY WAY TO FIND OUT THE TYPE OF POWER SYSTEM

When you need to determine the type of power you have in a plant, use the following simple procedure:

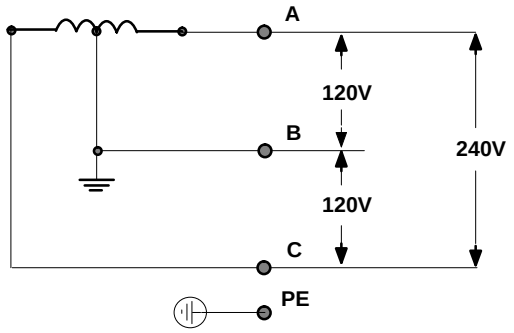
1. Label each wire with an identification tag, i.e. A, B, C, etc. This is especially helpful when all wires are of the same color.
2. Jot down the total number of combinations you can derive from the wires you have, e.g.:
   3 wires will have 3 combinations,
   4 wires will have 6 combinations,
   5 wires will have 10 combinations.

Example:
4 wires labeled A, B, C, D equals 6 possible combinations:
A to B, A to C, A to D,
B to C, B to D,
C to D.

3. Using your multimeter, measure the voltages between all the wire combinations. Note the voltages.
4. The lower voltages are the mains voltages whereas the higher voltages are the phase voltages. This procedure can be used for any power system, regardless whether it is an Edison, a wye (star), delta (mesh) or a crazy leg delta.

Let's apply this procedure to get a better understanding of the three basic power systems.

4.13.5.1 Edison System, 120/240V AC, Single-phase, 3-wire

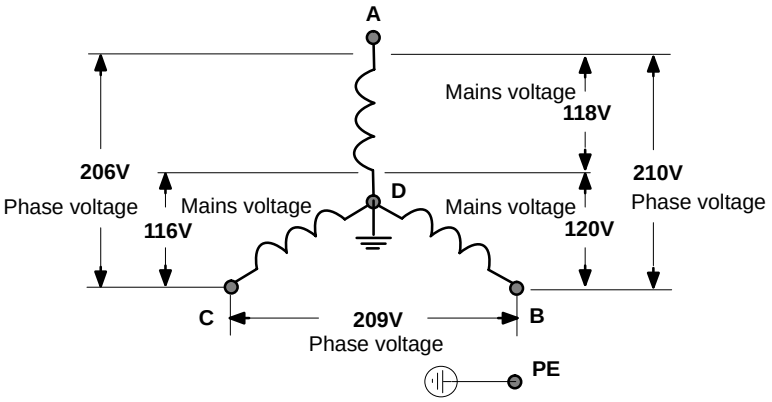


Single-phase (two-phase) current, three-wire, earthed midpoint

There are 3 wires, therefore there are 3 combinations.
Example:

A to B = 120Vac mains voltage,
A to C = 240Vac phase voltage,
B to C = 120Vac mains voltage.

4.13.5.2 Wye (star) System, 120/208V AC or 230/398V AC, Three-phase, 4-wire



Three-phase current, star connection, four-wire, earthed neutral

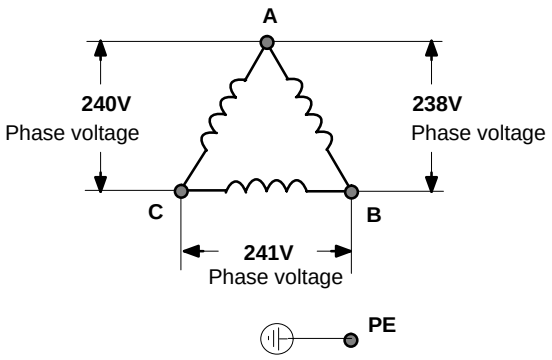
There are 4 wires, therefore there are 6 combinations.
Example:

A to B = 210Vac,	B to C = 209Vac,
A to C = 206Vac,	B to D = 120Vac,
A to D = 118Vac,	C to D = 116Vac.

The illustration shows the symmetry of the configuration. The characteristics of this system are:

- the phase voltages A to B, B to C and A to C are all within ±10% of each other,
- the mains voltages A to D, B to D and C to D are all within ±10% of each other,
- the phase voltage is 1.73 times the mains voltage,
- the loads in the system account for the slight differences among the mains voltages and the phase voltages

4.13.5.3 Delta (Mesh) System, 240V AC or 398V AC, Three-phase, 3-wire



Three-phase current, delta connection, 3-wire, 240Vac or 398Vac;

There are 3 wires, therefore there are 4 combinations.
Example:

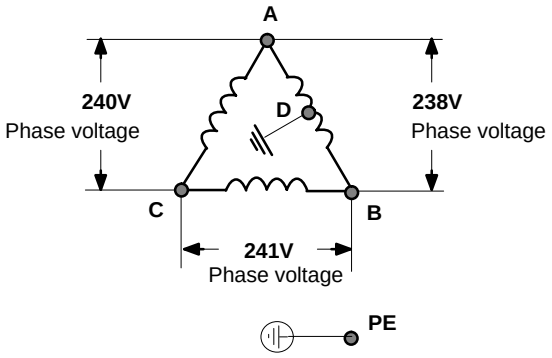
A to B = 238Vac,
A to C = 240Vac,
B to C = 241Vac.

The characteristics of the delta system are:

– there is no neutral so there are no mains voltages,

– the phase voltages A to B, A to C and B to C are within ±10% of each other.

4.13.5.4 Wild Leg (crazy leg) Delta System, 120/240V AC, Three-phase, 4-wire



Three-phase current, wild leg delta connection, 4-wire, 120/240Vac, earthed midpoint of phase;

There are 4 wires, therefore there are 6 combinations.
Example:

A to B = 238Vac,	B to C = 240Vac,
A to C = 240Vac,	B to D = 119Vac,
A to D = 119Vac,	C to D = 208Vac.

Occasionally, you will find a delta system in which one phase is center tapped and grounded. This is called a wild leg delta. It produces two mains voltages which are each equal to half of the phase voltage.

Example:
A to D = 120Vac mains voltage,
A to C = 120Vac mains voltage,
A to B = 240Vac phase voltage.

The voltage between C and D in the wild leg delta system is usually not within the specifications for our equipment. Use the following formula to determine the C or D voltage:

Phase voltage divided by 2, multiplied with 1.73

In our example:

240Vac : 2 * 1.73 = 208Vac

This voltage can vary significantly if the phase voltage is less than 240Vac or if there are unbalanced loads on the delta system.

If the equipment which you are installing requires three-phase power, the customer must correct the system before the equipment can operate.
If the equipment requires only single-phase power, you can install the equipment but be sure to use one of the wires with the correct voltage.

4.13.6 REQUIRED EXTERNAL CIRCUIT BREAKER AND CROSS SECTIONS FOR THE MAINS / EARTH CABLES

	Mains System	Cross Section	Cable Type	Circuit Breaker Wall Outlet
Europe	3 Ph+N+PE 230/400V	5 x 6mm^2	H07RNF5G6.0	223-25K ABB-Stotz
	1Ph+N+PE 230V	3 x 6 mm^2	H07RNF3G6.0	222-32K ABB-Stotz
USA	3 Ph+N+PE 120/208V	AWG 10/5x	SO 600V	223-25K ABB-Stotz *
	Ph + Ph + PE 208V	AWG 8/3x	SO 600V	222-32K ABB-Stotz
Japan	3 Ph+N+PE 100/200V	AWG 10/5x	SO 600V	223-25K AB-Stotz *
	Ph + Ph + PE 200V	AWG 8/3x	SO 600V	222-32K ABB-Stotz

*see NEC Code 1993 240-4 Exception No.1

Manufacturer for circuit breaker:

ABB-Stotz-Kontakt GmbH
D-69123 Heidelberg
Eppelheimer Str. 82
Tel: 06221 / 701 748

4.14 INSTALLATION OF THE POWER CORD

4.14.1 LOCATION OF MAINS TERMINAL UNIT FH 4030, FH 4032, FH 4033

The mains terminal, the line filter and the central earth screw are located between Rack 2 and Rack 3 in the rear of the cabinet.

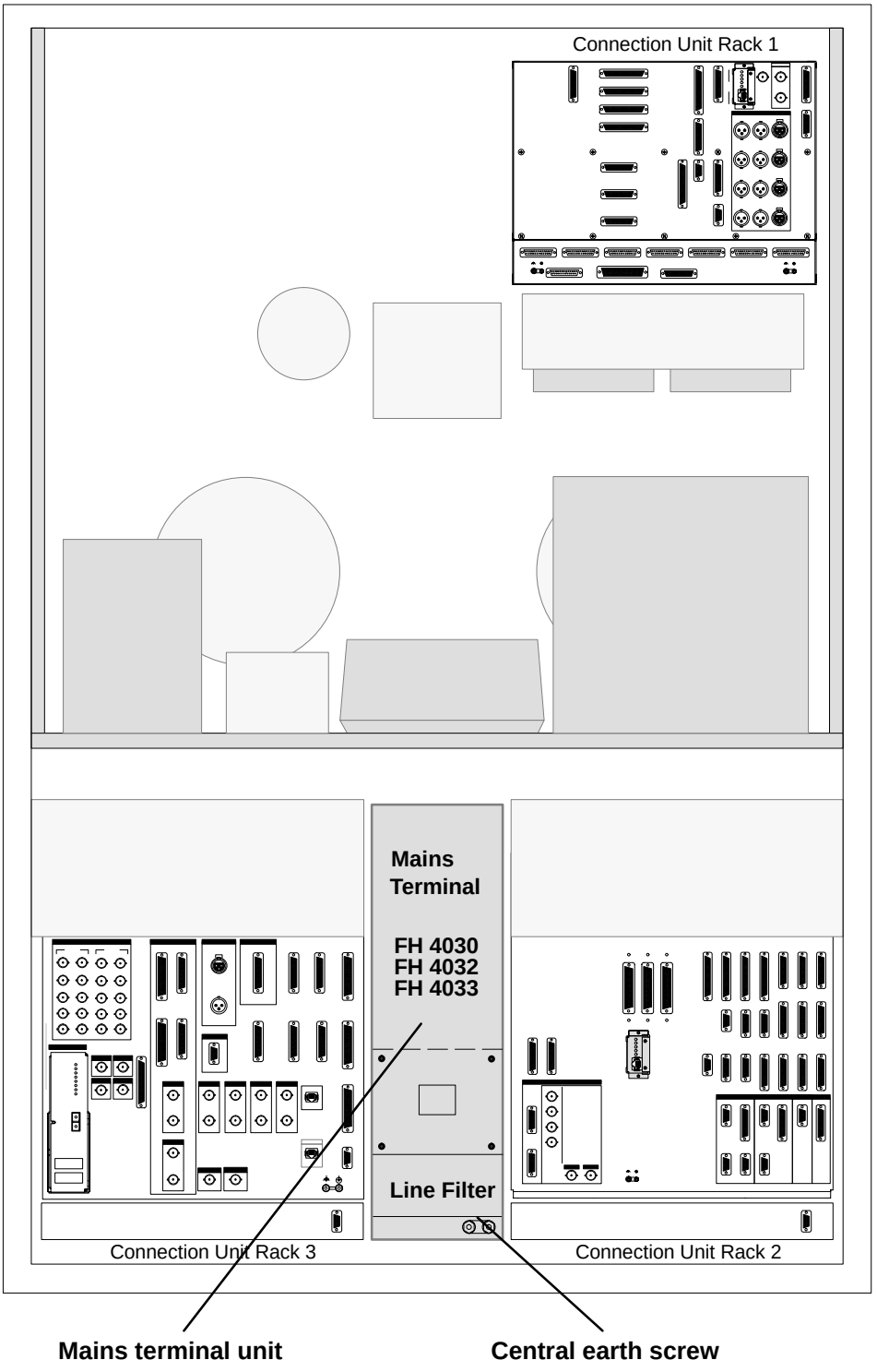


Fig. 428: Shadow Telecine, rear view

4.14.2 THREE-PHASE POWER TERMINAL UNIT FH 4030

Three-phase voltage has to be connected via a power cord to the line filter in the power terminal unit (FH 4030) from the rear of the telecine cabinet:

Remove the lower case at the rear side of the power terminal unit (4 hex screws).
Open the cover plate of the line filter (6 screws).
Pass the insulated power cord, provided with multicore cable ends, through the cable tube of the cabinet and of the line filter.

Terminate the cable ends at the input connecting block of the line filter as follows:

Protective earth	**PE**	to	⏚ **PE**(IN)
(**PE** has to be terminated at first!)			
Neutral	**N**	to	**N** (IN)
Phase	**L1** (**U**)	to	**L1** (IN)
Phase	**L2** (**V**)	to	**L2** (IN)
Phase	**L3** (**W**)	to	**L3** (IN)

(The arrangement of the phases is optional)

Fasten the strain relief of the cable tube and reinstall the cover plate of the line filter and the housing of the power terminal unit.

For more details see circuit diagram 1-12840-30-SP (FH 4030).

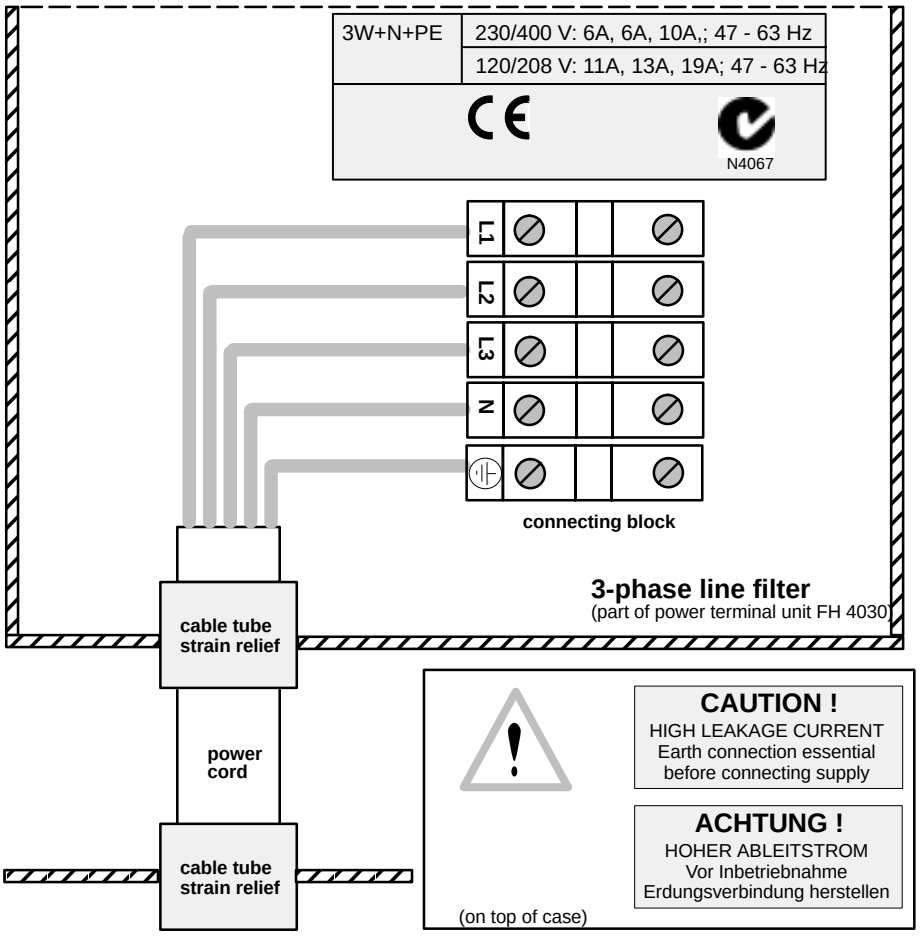


Fig. 429: **3-phase line filter**, with removed cover plate (FH 4030), top view

4.14.3 SINGLE-PHASE POWER TERMINAL UNIT FH 4032, OPTION

The **phase-to-neutral voltage must have** a value of about **230V.**

Note: 120V mains operation is not possible!

Single-phase voltage has to be connected via a power cord to the line filter within the power terminal unit (FH 4032) from the rear of the telecine cabinet:

Remove the cover plate of the connecting block (4 screws).

Terminate the cable ends at the input connecting block of the line filter as follows:

Protective earth (**PE** has to be terminated at first!)	**PE**	to	**PE IN**
Phase	**L1**	to	**L1 IN**
Neutral	**N**	to	**L2 IN**

Fasten the strain relief and the cover plate of the connecting block.

For more details see circuit diagram 1–12840–32–SP (FH 4032)

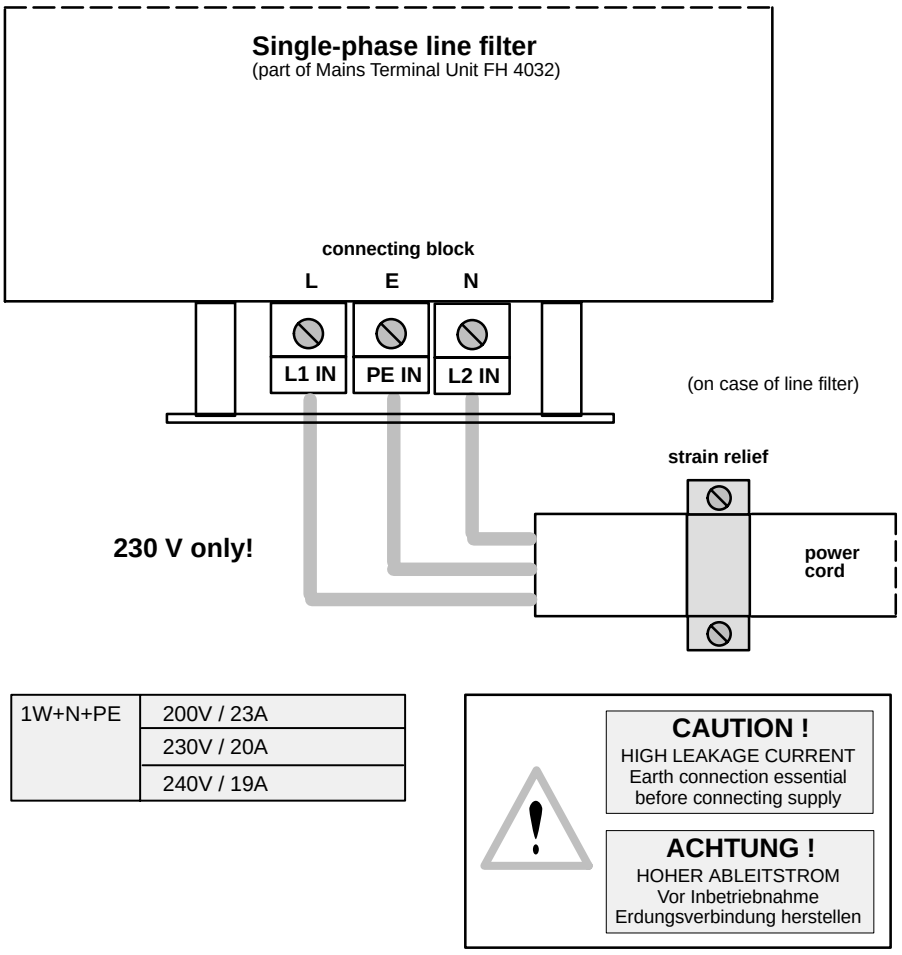


Fig. 430: **Single-phase line filter** (FH 4032), top view

4.14.4 TWO-PHASE POWER TERMINAL UNIT FH 4033, OPTION

The **phase-to-phase voltage must have** a value of about **208V.**

Note: 120V mains operation is not possible!

Two-phase voltage has to be connected via a power cord to the line filter within the power terminal unit (FH 4033) from the rear of the telecine cabinet:

Remove the cover plate of the connecting block (4 screws).

Terminate the cable ends at the input connecting block of the line filter as follows:

Protective earth	**PE**	to	**PE IN**
(**PE** has to be terminated at first!)			
Phase	**L1**	to	**L1 IN**
Phase	**L2**	to	**L2 IN**

Fasten the strain relief and the cover plate of the connecting block.

For more details see circuit diagram 1–12840–32–SP (FH 4033)

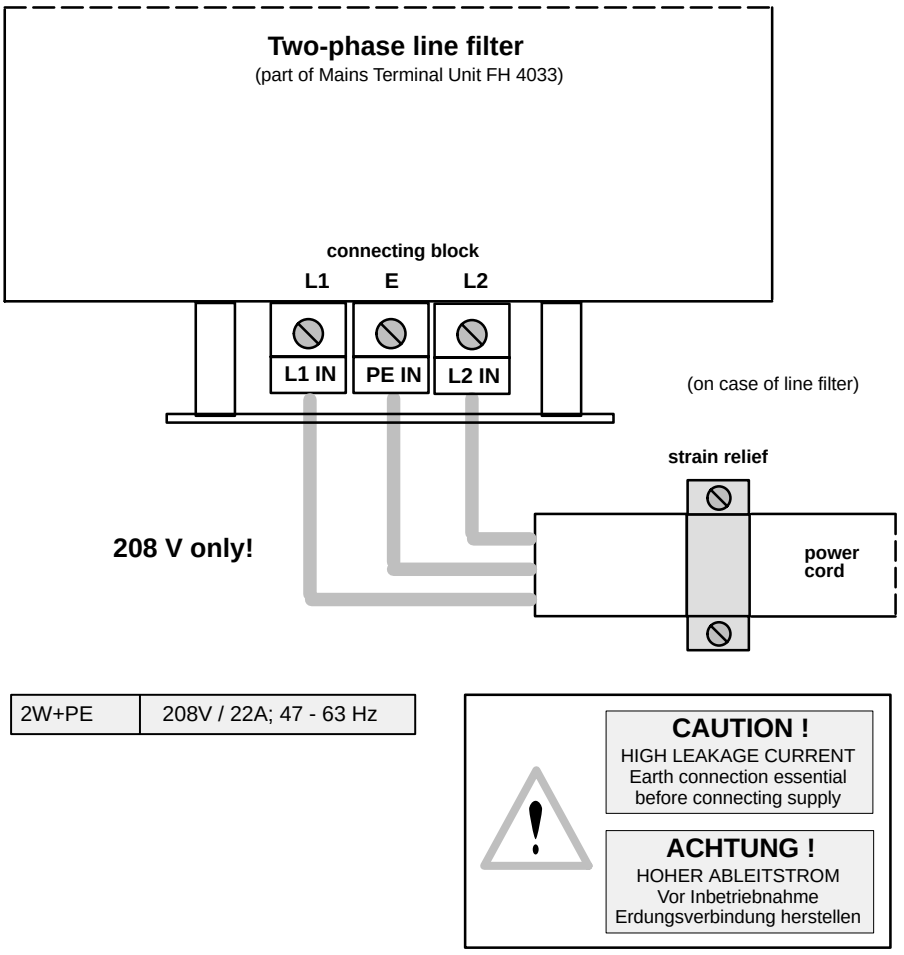


Fig. 431: **Two-phase line filter** (FH 4033), top view

4.15 MAINS FUSES

4.15.1 POWER TERMINAL UNIT 1-PHASE FH 4032

The mains fuses set FH 4062 for the subunits is contained in the respective power terminal unit FH 4032. The dimensions of the fuses are 5 × 20mm.
The current ratings are written on the mounting plate beside the fuse holders for 230V as shown below:

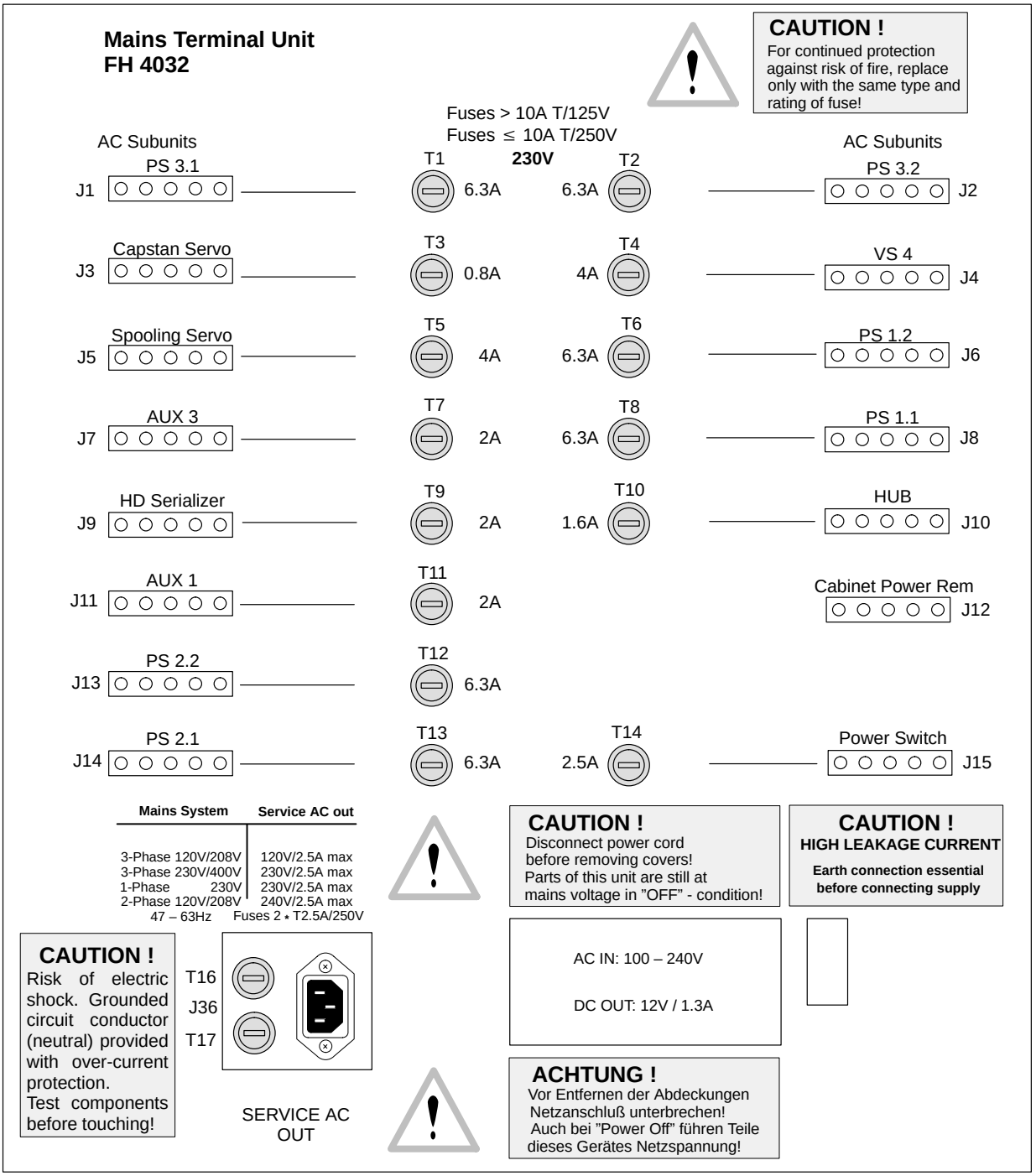


Fig. 432: Power terminal unit FH 4032

4.15.2 POWER TERMINAL UNIT 2-PHASE FH 4033

The mains fuses set FH 4063 for the subunits is contained in the power terminal unit FH 4033. The dimensions of the fuses are 6.3 × 32mm.
The current ratings are written on the mounting plate beside the fuse holders for 208V as shown below:

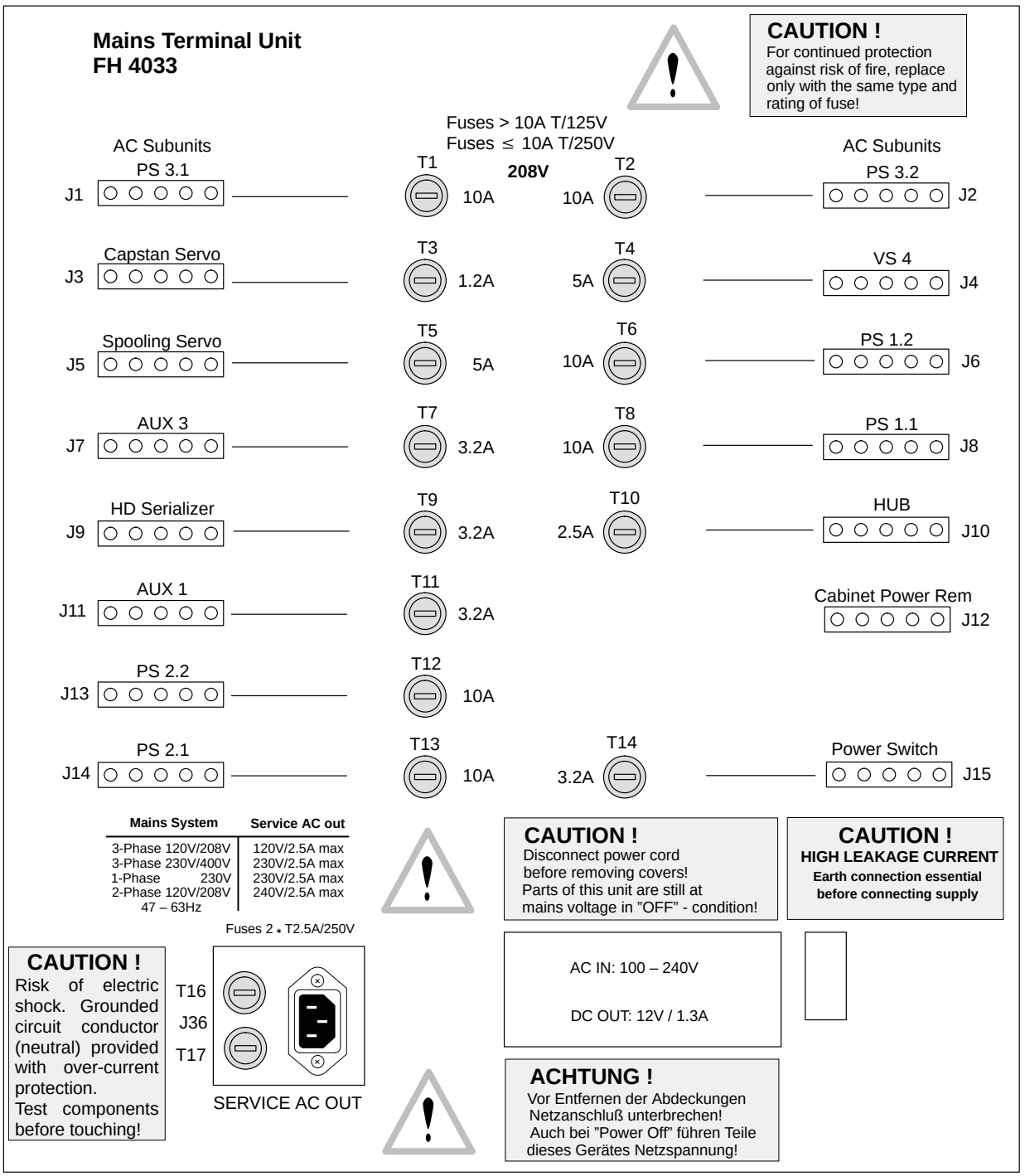


Fig. 433: Power terminal unit FH 4033

4.15.3 POWER TERMINAL UNIT 3-PHASE FH 4030

The mains fuses set FH 4061 (120/208V) or FH 4062 (230/400V) for the subunits is contained in the power terminal unit FH 4030. The dimensions of the fuses are 6.3 × 32mm (FH 4061) or 5 x 20mm (FH 4062).
The current ratings are written on the mounting plate beside the fuse holders for 120V and 230V as shown below:

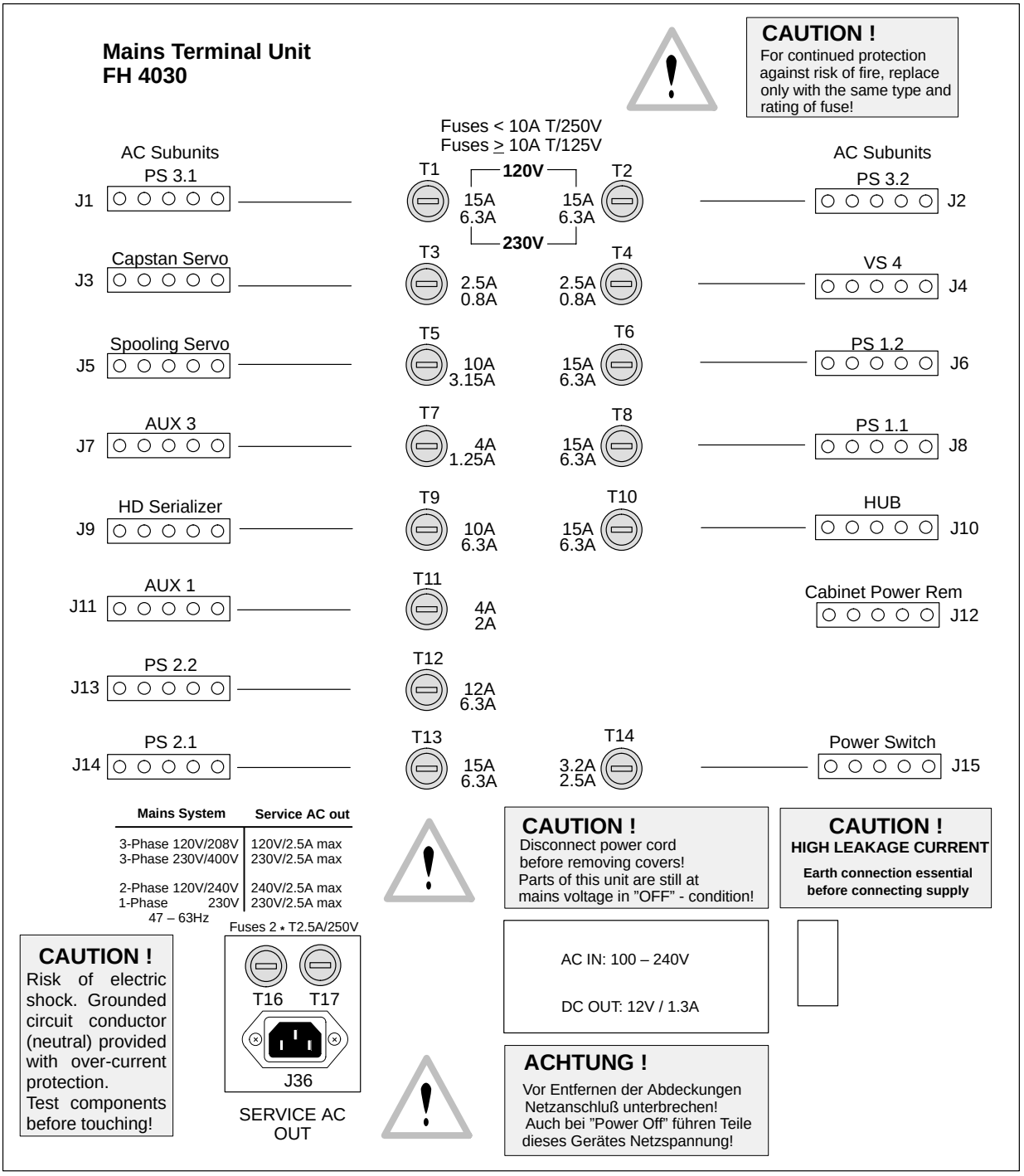


Fig. 434: Power terminal unit FH 4030

Attention:

When changing fuses, it is mandatory to use only high-breaking fuses links of same type and current rating as a replacement. Using mended fuses or shorting the fuse holder is not permissible.

For more details see circuit diagram 1–12840–30–SP sheet 2



CAUTION !

For continued protection against risk of fire, replace only with the same type and rating of fuse !

Attention:

After having switched over to another mains voltage, make sure that the corresponding fuses are inserted. For this purpose, see the indicated fuse ratings on the front panels of the units or subunits.
The subunits also contain fuses which have to be changed!
(see chapter "Mains connection of subunits and mains voltage change")

Overview fuses sets

Fuse no.	AC Subunit	Fuses set FH 4061	Fuses set FH 4062	Fuses set FH 4063
		3 phase (UL version) Mains system 120V / 208V UL 248.14 6.3 x 32 mm	**1 or 3 phase Mains system 230V Mains system 230V / 400V IEC 127 5 x 20 mm**	**2 phase (UL version) Mains system 208V UL 248.14 6.3 x 32 mm**
T1	Power Supply 3.1	T 15A	T 6.3A	T 10
T2	Power Supply 3.2	T 15A	T 6.3A	T 10
T3	Capstan Power Stage	T 2.5A	T 0.8A	T 1.2
T4	VS 4	T 2.5A	T 4A	T 5
T5	Spooling Power Stage	T 10A	T 4A	T 5
T6	Power Supply 1.2	T 15A	T 6.3A	T 10
T7	Aux 3	T 4A	T 2A	T 3.2
T8	Power Supply 1.1	T 15A	T 6.3A	T 10
T9	HD Serializer	T 10A	T 2A	T 3.2
T10	Hub	T 15A	T 1.6A	T 2.5
T11	Aux 1	T 4A	T 2A	T 3.2
T12	Power Supply 2.2	T 12A	T 6.3A	T 10
T13	Power Supply 2.1	T 15A	T 6.3A	T 10
T14	Power Switch	T 3.2A	T 2.5A	T 3.2
T16	Service AC Out socket	T 2.5A	T 2.5A	T 2.5
T17	Service AC Out socket	T 2.5A	T 2.5A	T 2.5

4.16 LOCATION OF POWER SUPPLY UNITS OF RACKS 1-3

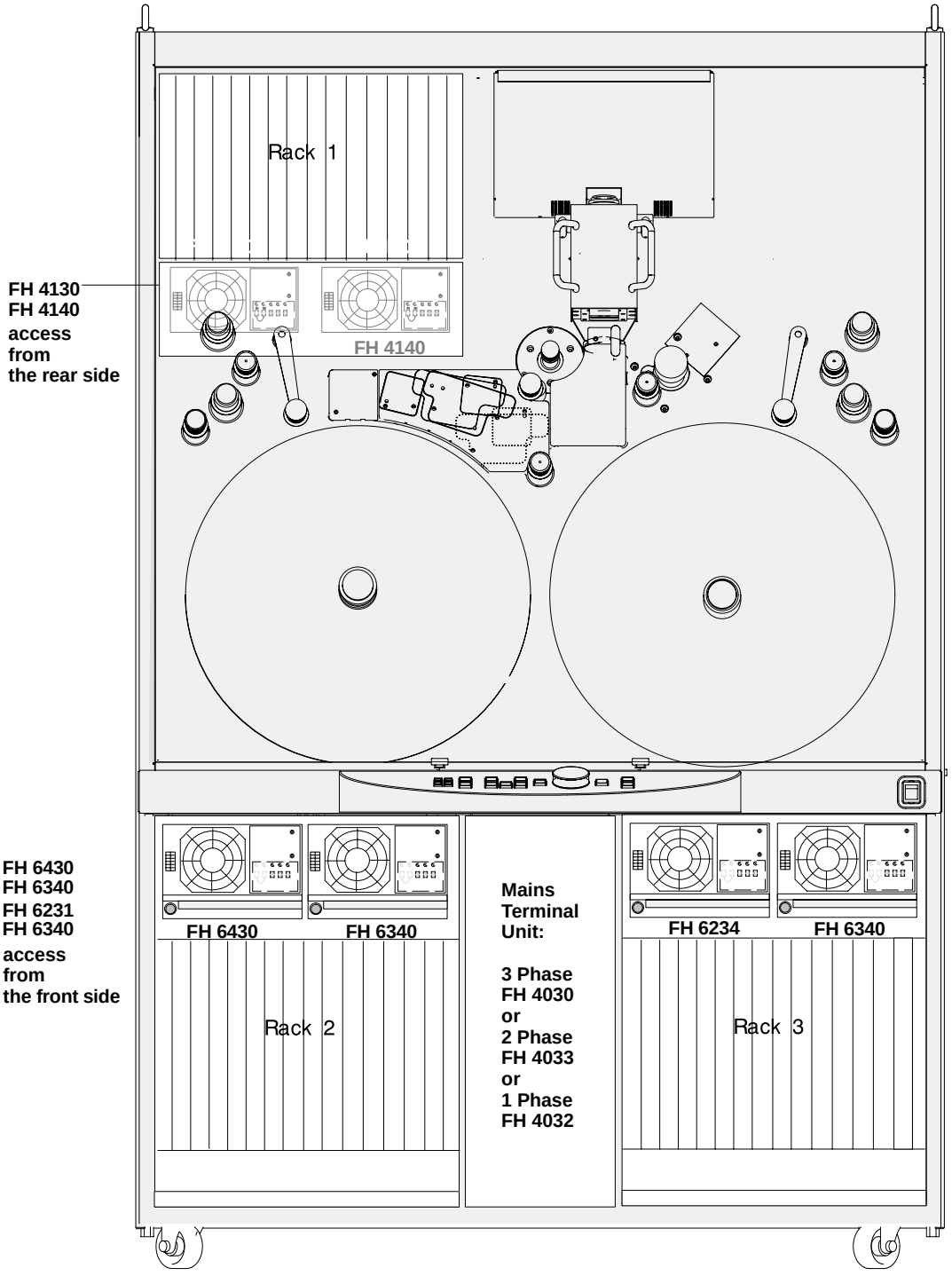


Fig. 435: Shadow – Front view

4.16.1 REMOVAL OF POWER SUPPLY UNITS OF RACK 1

Switch off the telecine unit, open the rear doors and disconnect it from mains by switching off the circuit breaker at the Power Terminal Unit (3 Phase) FH 4030 or (2 Phase) FH 4033 or (1 Phase) FH 4032!

For exchange or mains change of the power supply units of Rack 1, it is necessary to remove them from the frame support Rack 1.

1. Disconnect the DC connection cables from the power supply units (see fig. 436).
2. Unscrew the two fixing screws (right and left side) of the mounting plate of the power supply units from below (see fig. 437).
3. Carefully pull the mounting plate with the power supply units and fans out of the frame support by disconnecting the both mains cable (see fig. 437) from the cable connector at the rear of the power units .
4. Unscrew the eight fixing screws on top of the unit for demounting the power supply units (see fig. 438).

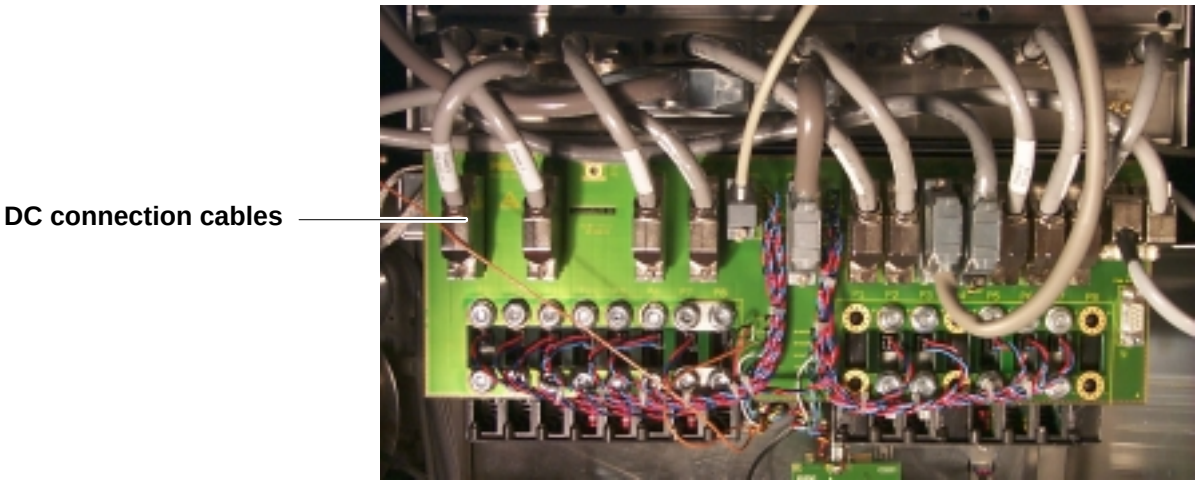


Fig. 436: Power terminal panel of Rack 1

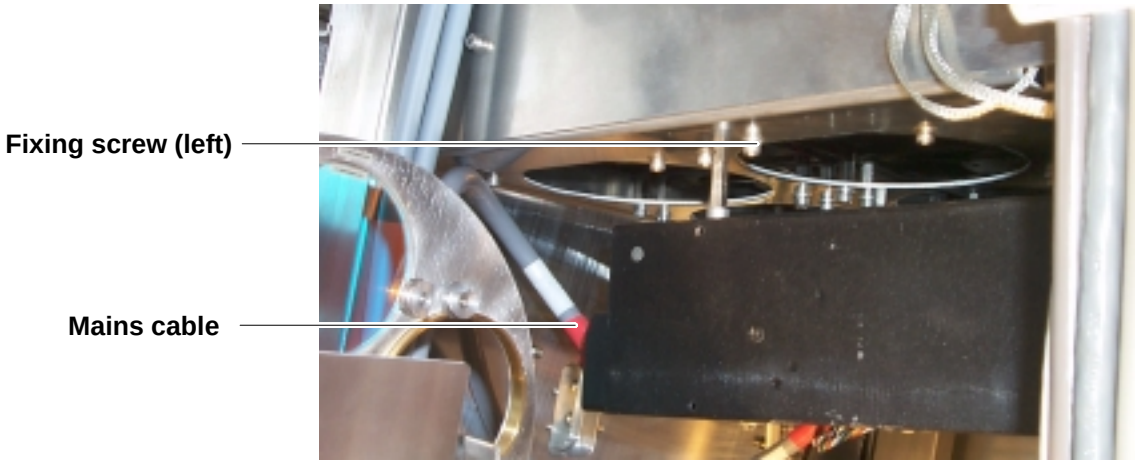


Fig. 437: Fixing screws of Power supply units in Rack 1

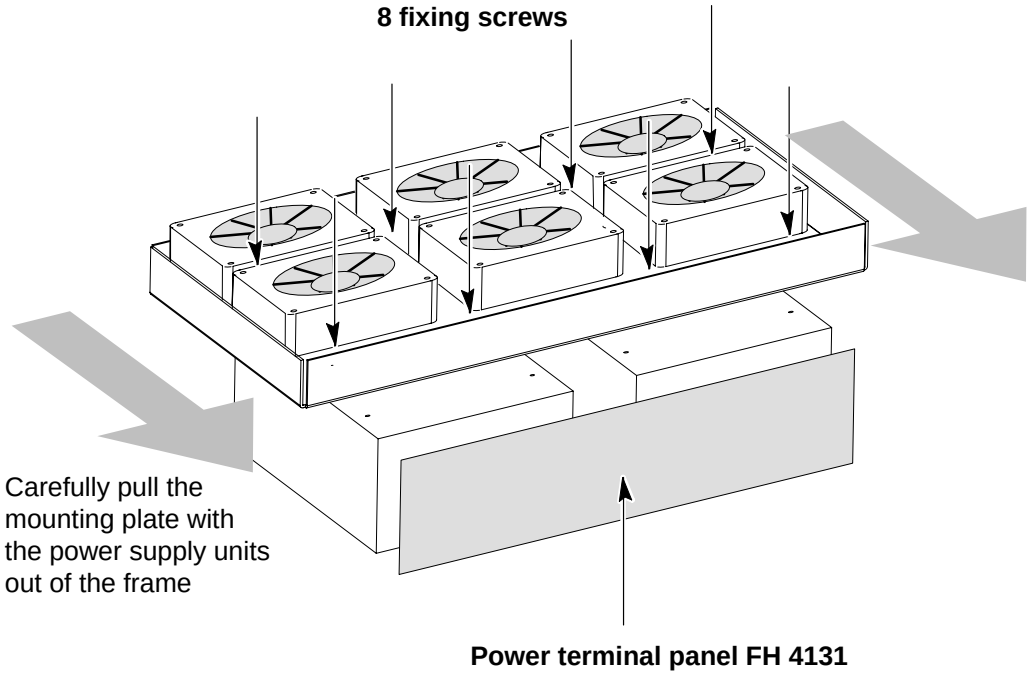


Fig. 438: Power supply units of Rack 1, rear view

4.16.2 REMOVAL OF POWER SUPPLY UNITS OF RACK 2 and 3

Switch off the telecine unit, open the rear doors and disconnect it from mains by switching off the circuit breaker at the Power Terminal Unit (3 Phase) FH 4030 or (1 Phase) FH 4032 or (2 Phase) FH 4033!

For exchange or mains change (FH 6230, FH 6234, FH 6340) of the power supply units of Rack 2-3, it is necessary to remove them from the frame support Rack 2-3, as follows:

1. Open the front doors Rack 2-3.
2. Unscrew the two screws (see fig. 439) and remove the cover plate of the mains connecting block.
3. Disconnect the mains cable from J9 to the appropriate Rack “Mate-n-Lok” connector.
4. Remove the plastic cap and unscrew the locking screw.
5. Pull the handle and remove the power supply unit from the frame support.

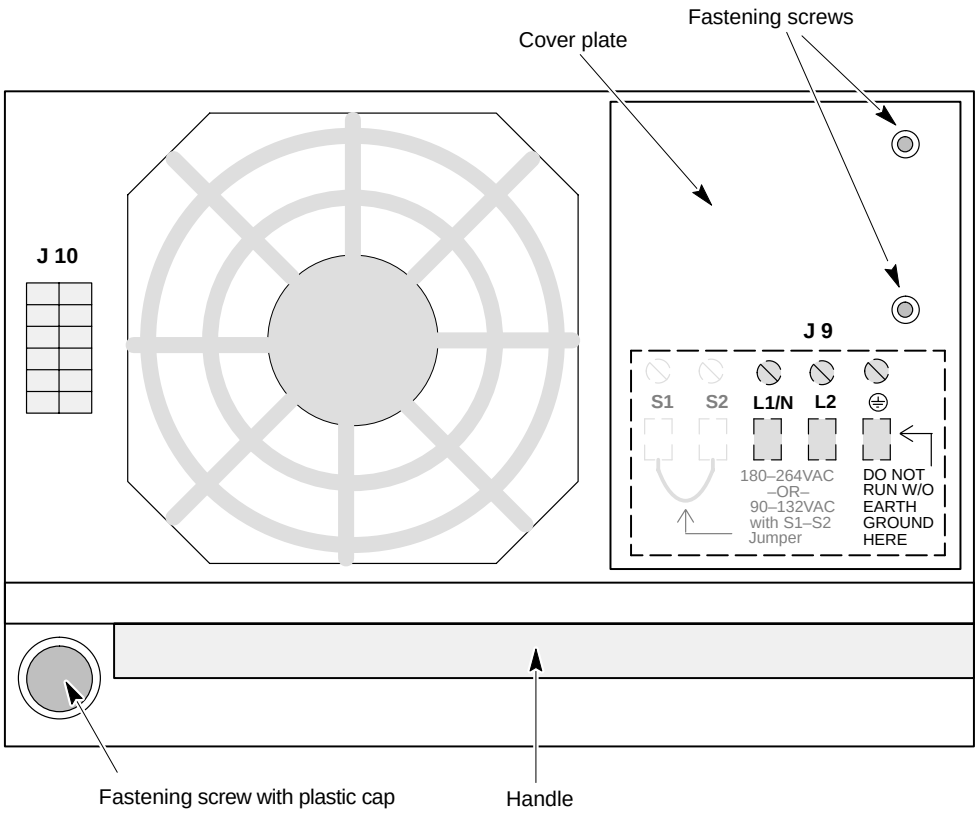


Fig. 439: Power supply unit of Rack 2 and 3

5. CONNECTIONS TO EXTERNAL EQUIPMENT

5.1 EMC TERMINAL PANEL WITH CABLE FEED-THROUGH

To avoid EMC (electromagnetic compatibility) problems feed all connection cables (except iMCS connections) through the Cable feed trough and contact the cable shields to ground with the earthing clamps or the EMI gasket.
Differences in coax and audio cable diameters should be compensated by using an EMI shielding Tape with conductive adhesive.
The iMCS (internal machine communication system) connections have to be plugged onto the four RJ45 ports of the terminal panel, see chapter 5.6.

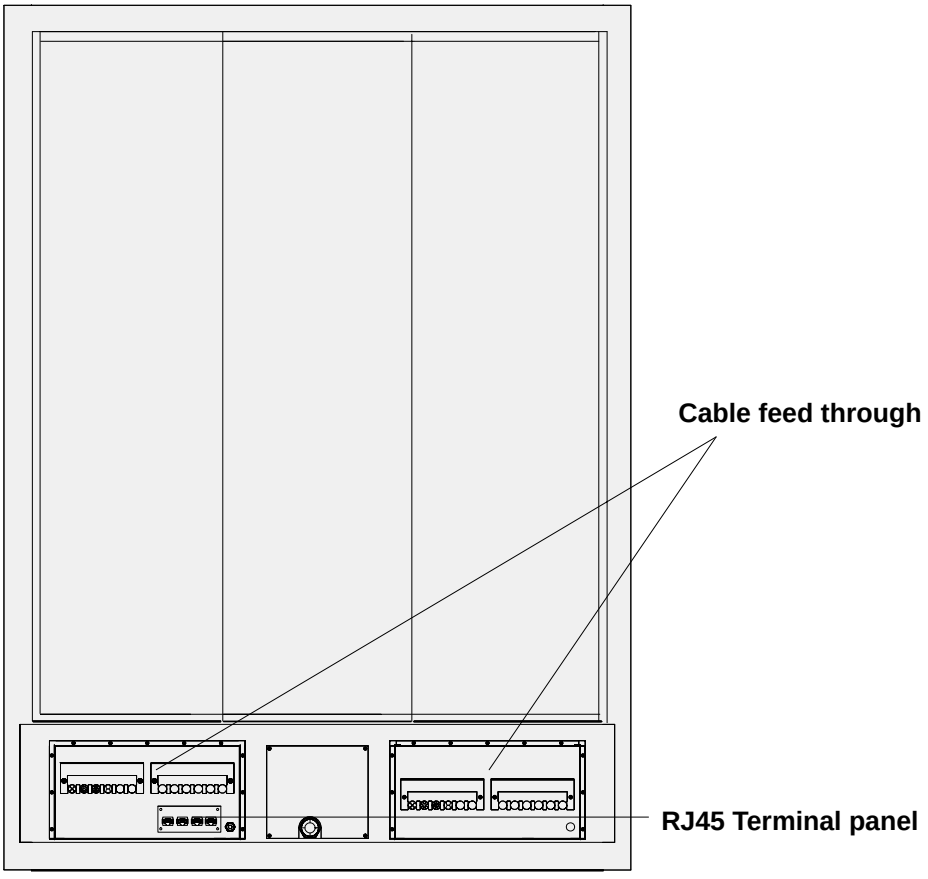


Fig. 500: Shadow Telecine, rear view

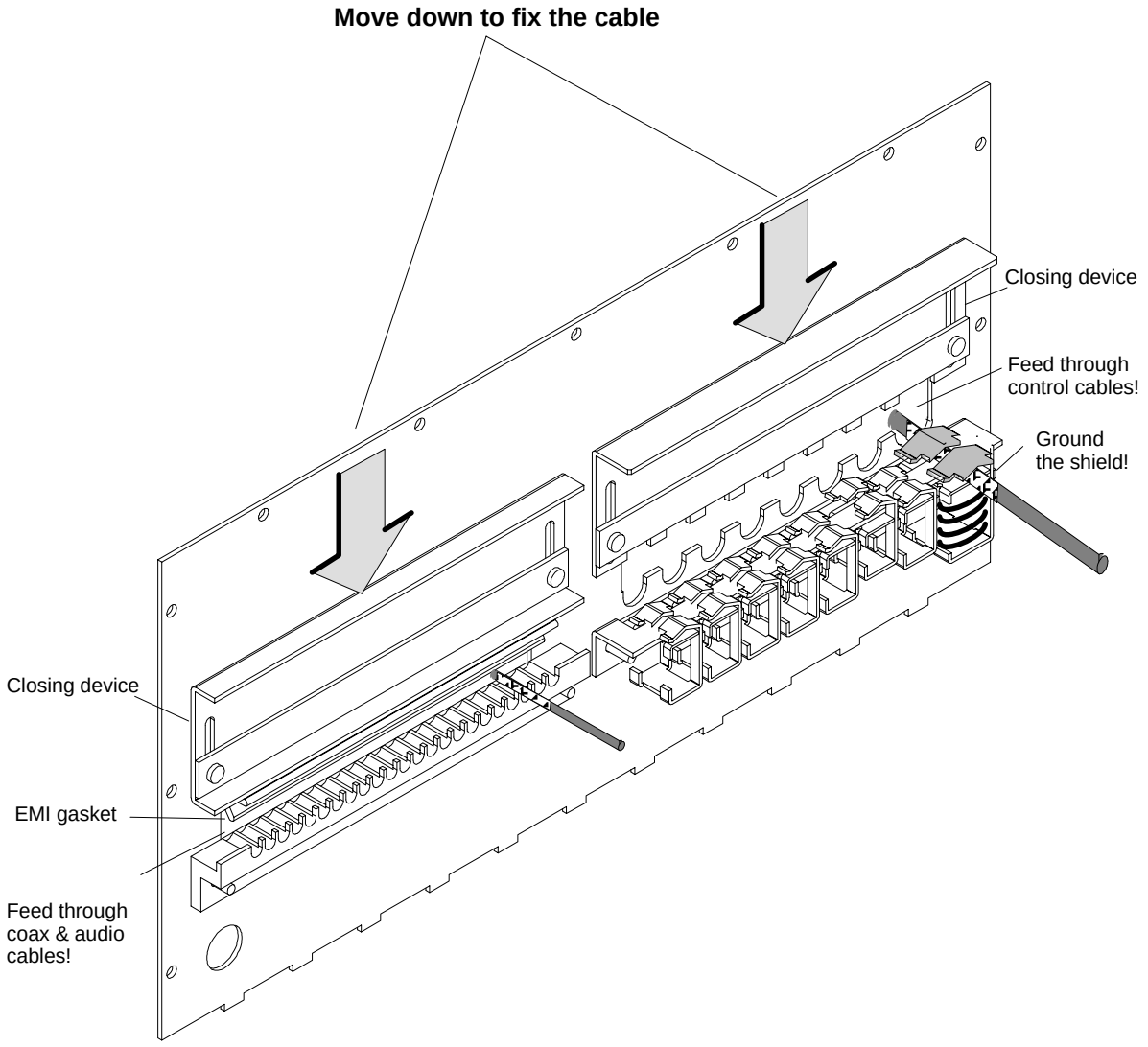


Fig. 501: Rear view of the cable feed through

5.2 OVERVIEW CONNECTION UNITS RACK 1 - 3

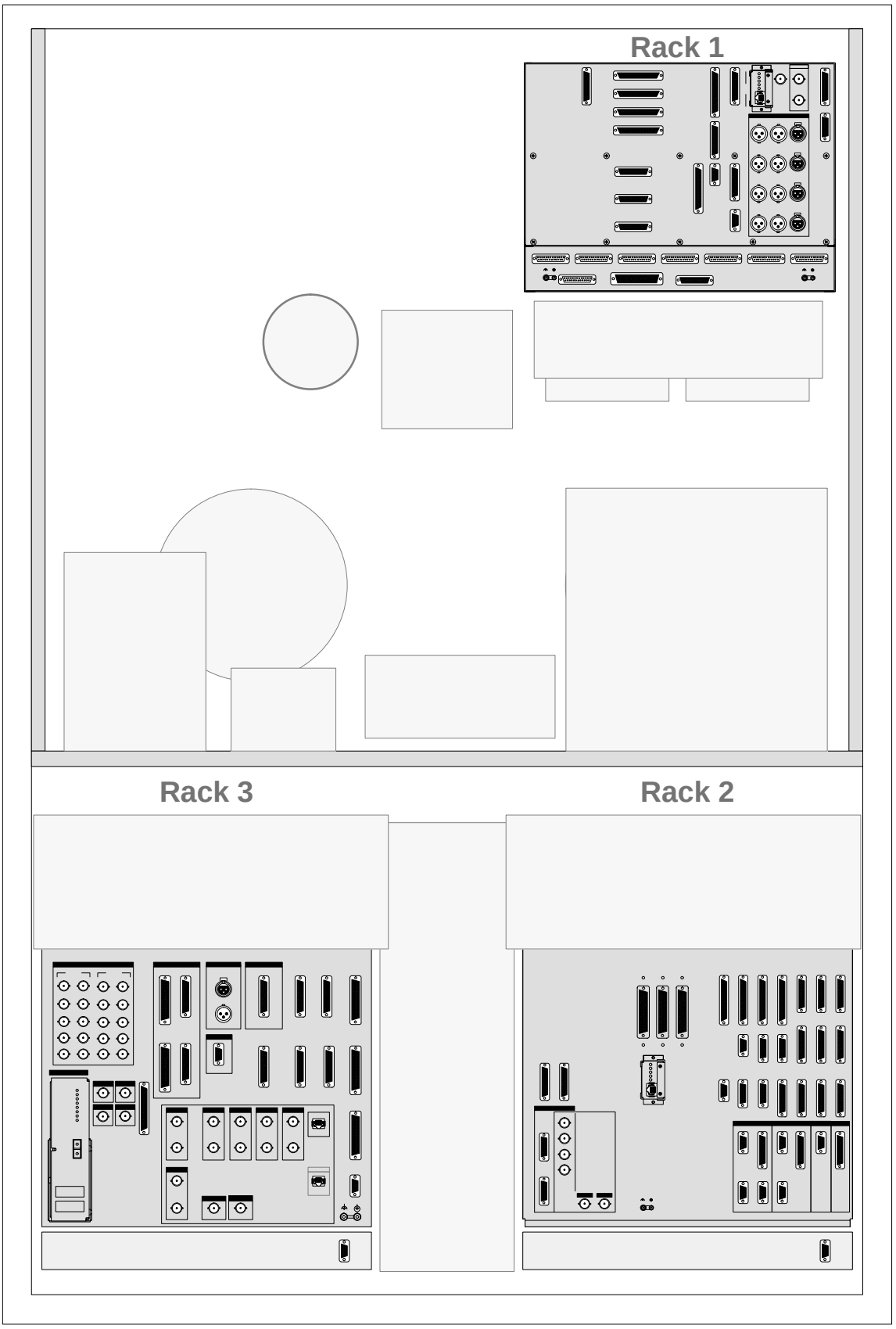


Fig. 502: Shadow Telecine, rear view

5.3 CONNECTION UNIT FH 4125 (RACK 1)

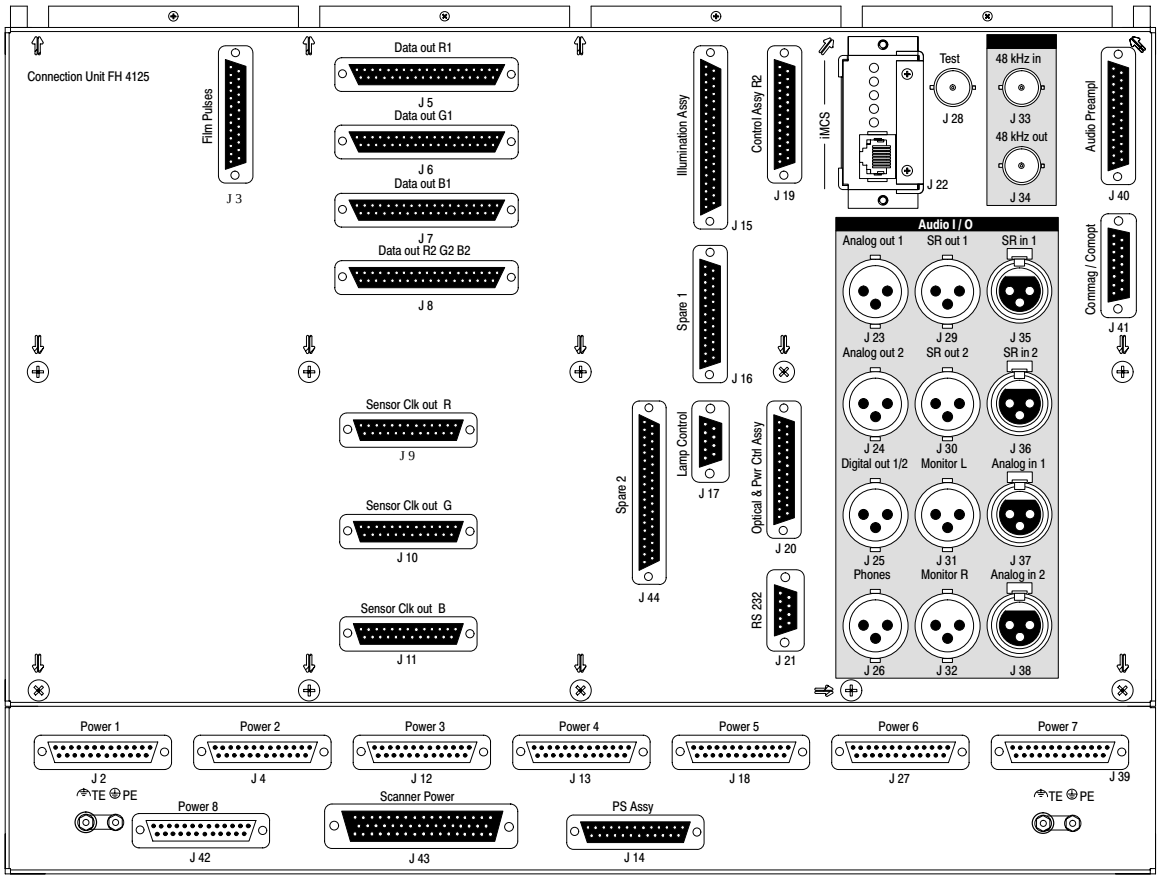


Fig. 503: Connection Unit FH 4125

Note:

The connectors on the connection fields backed gray, serve the external cabling. All the other connectors are required for the internal cabling and must not be changed!

The following chapters describe the connectors with their functions.

5.3.1 AUDIO IN- AND OUTPUTS

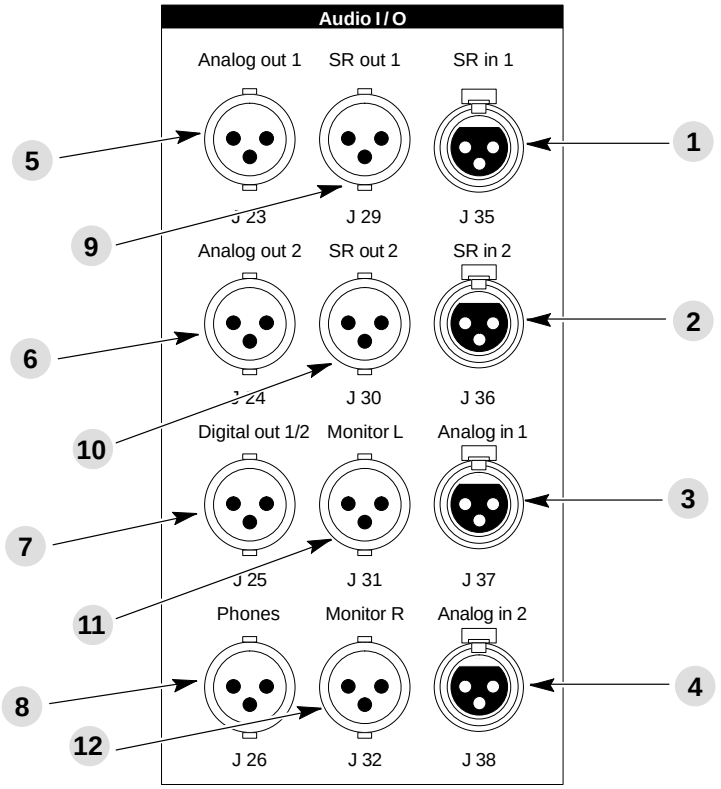


Fig. 504: Part of the connection unit FH 4125 (Audio I/O)

Item no.	Socket / Connector Description	Socket type Connector type	Function
1	J 35 SR in 1	XLR female	Symmetrical audio inputs for the feed-in of a Dolby-SR-audio signal, impedance > 10 kOhm. Level switchable –3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level.
2	J 36 SR in 2	XLR female	
3	J 37 Analog in 1	XLR female	Symmetrical audio inputs, impedance > 10 kOhm. Level switchable –3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level.
4	J 38 Analog in 2	XLR female	
5	J 23 Analog out 1	XLR male	Symmetrical audio outputs, impedance < 40 Ohm. Level switchable –3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level.
6	J 24 Analog out 2	XLR male	

Item no.	Socket / Connector Description	Socket type Connector type	Function
7	J 25 Digital out 1/2	XLR male	Digital, serial interface for the audio channels, based on the AES-EBU standard. Mono/Stereo interface. AES Recommended Practice Draft AES 3-1992 (ANSI S4.40, 1992) Impedance 110 Ohm Level: outputs > 3 Vpp At pin 2 and 3 of the XLR male the push-pull signals are connected via twisted-pair cable. pinning: pin 1 screening pin 2 signal pin 3 signal
8	J 26 Phones	XLR male	Symmetrical analog stereo output for headphones, XLR males, impedance 150 Ohm. Minimum load 32 ohm. Level switchable –3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level. The volume is also controlled by the multi function dial on the control panel. pinning: pin 1 ground pin 2 left channel pin 3 right channel
9	J 29 SR out 1	XLR male	Symmetrical audio outputs to external Dolby-SR-devices signals, XLR males, impedance < 40 Ohm. Level switchable –3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level.
10	J 30 SR out 2	XLR male	
11	J 31 Monitor L	XLR male	Symmetrical analog audio output Left or Right for monitoring (active speaker), impedance < 40 Ohm. Level switchable –3, 0, 4, 8 dBu for 0 VU = 9 dB below normal level. Volume control from $-\infty$ to +6 dB by the multi function dial on the control panel.
12	J 32 Monitor R	XLR male	

5.3.2 AUDIO REFERENCE SIGNALS

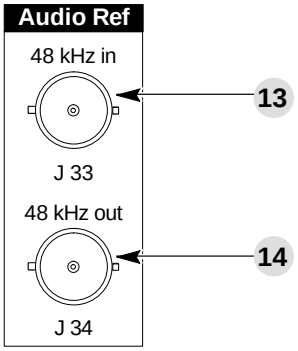


Fig. 505: Part of connection unit FH 4125 (Audio Ref)

Item no.	Socket / Connector Description	Socket type Connector type	Function
13	J 33 48 kHz in	BNC connector	Input to feed-in an external 48 kHz word clock, to synchronize the Telecine audio processor with external, digital audio components. Without external 48 kHz signal the digital audio is synchronized with the video output signal (TTL-Level).
14	J 34 48 kHz out	BNC connector	48 kHz clock output to synchronize external, digital audio components (TTL-Level).

5.3.3 INTERNAL CONNECTIONS

The following table describes the internal cabling from rack to rack as well as the cabling to the individual subassemblies in the Shadow. The internal cabling must be changed by our service personnel only.

The table is only important for the service personnel and serves at this place only for the information of the customer.

Item no.	Socket / Connector Description	Connected to	Cable (set)
1	J 2, Power 1	J 2, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 1
2	J 3, Film Pulses	J 72, Pulses R1 on Connection Unit FH 4225 Rack 2	FH 6056 Multiclock Cable Set Multiclock Cable
3	J 4, Power 2	J 3, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 2
4	J 5, Data out R1	J 52, Data in R1 on Connection Unit FH 4225 Rack 2	Data R1
5	J 6, Data out G1	J 47, Data in G1 on Connection Unit FH 4225 Rack 2	Data G1
6	J 7, Data out B1	J 45, Data in B1 on Connection Unit FH 4225 Rack 2	Data B1
7	J 8, Data out R2 G2 B2	J 57, Data in R2 G2 B2 on Connection Unit FH 4225 Rack 2	Data R2 G2 B2
8	J 9, Sensor Clk out R	J 5, Sensor Clock in R FH 4400 Film Scanner	FH 4056 Multiclock Cable Set SC Multiclock Cable 1 R
9	J 10, Sensor Clk out G	J 3, Sensor Clock in G FH 4400 Film Scanner	FH 4056 Multiclock Cable Set SC Multiclock Cable 1 G
10	J 11, Sensor Clk out B	J 1, Sensor Clock in B FH 4400 Film Scanner	FH 4056 Multiclock Cable Set SC Multiclock Cable 1 B
11	J 12, Power 3	J 7, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 3
12	J 13, Power 4	J 8, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 4
13	J 14, PS Assy	J 6, FH 4131 Terminal Panel Power Supply Rack 1	PS Assy
14	J 15, Illumination Assy	J 1, Control FY 4421 Illumination Interface	Illumination Assy
15	J 16, Spare 1	not use	
16	J 17, Lamp Control	J 5, FH 4131 Terminal Panel Power Supply Rack 1	Lamp Control
17	J 18, Power 5	J 11, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 5
18	J 19, Ctrl Assy R2	J 62, Ctrl Assy R1 on Connection Unit FH 4225 Rack 2	Ctrl Assy R1/R2

Item no.	Socket / Connector Description	Connected to	Cable (set)
19	J 20, Optical & Pwr Ctrl Assy	J 9, FH 4131 Terminal Panel Power Supply Rack 1	Optical & Pwr Ctrl Assy
20	J 21, RS 232	not used	
21	J 22, iMCS	J 7, AT-MR820TR Ethernet 10-Base-T Micro HUB	10Base_T_R1
22	J 27, Power 6	J 12, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 6
23	J 28, Test	not used	
24	J 39, Power 7	J 13, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 7
25	J 40, Audio Preampl	J 3, FY 6011 Intermediate Board	Audio Preampl
26	J 41, Commag / Comopt	J 2, FY 6011 Intermediate Board	Commag / Comopt
27	J 42, Power 8	J 1, FH 4131 Terminal Panel Power Supply Rack 1	FH 4059 Power Cable Set Power 8
28	J 43, Scanner Power	J 2, FH 4400 Film Scanner	Scanner Power
29	J 44, Spare 2	not used	

5.4 CONNECTION UNIT FH 4225 (RACK 2)

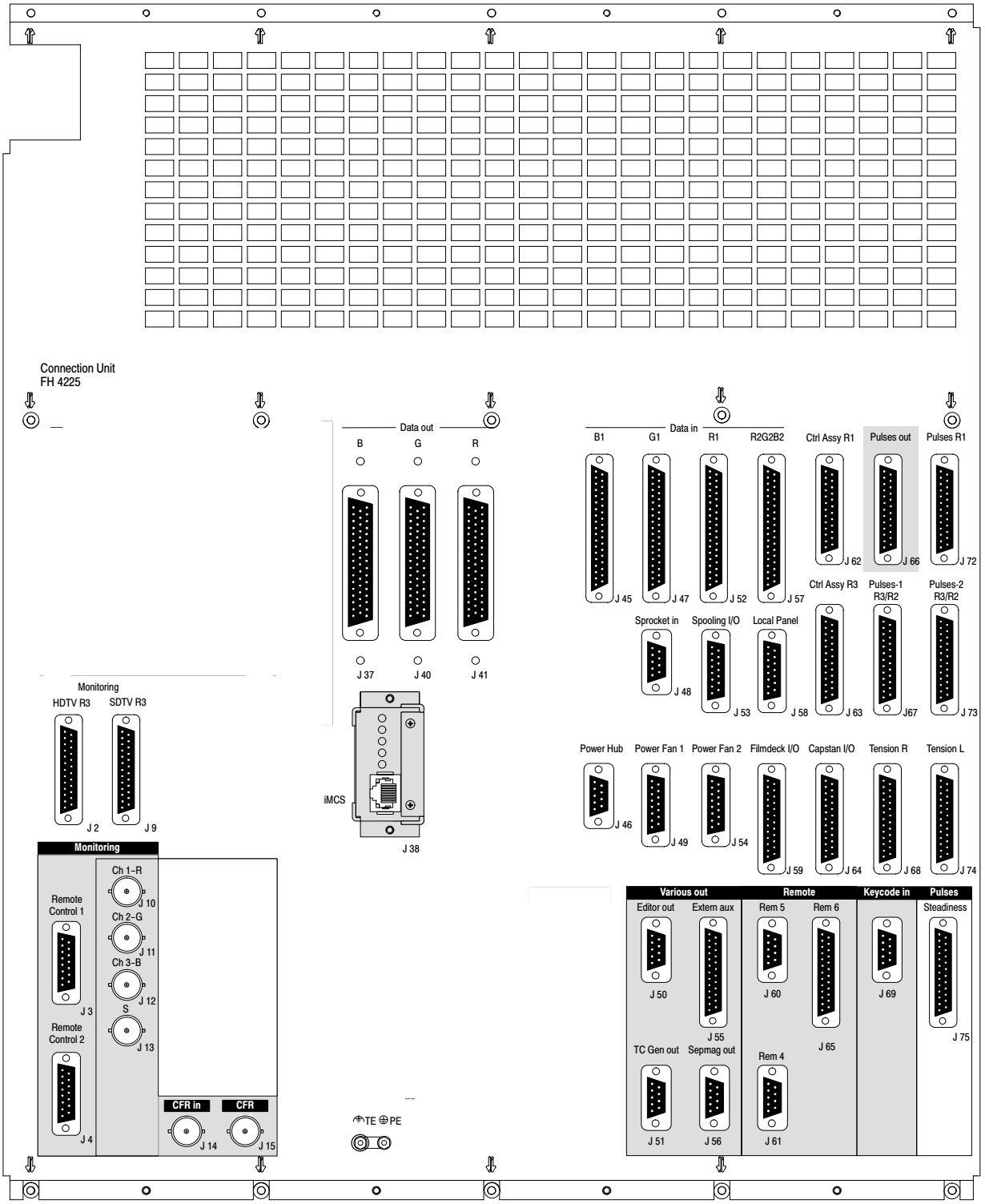


Fig. 506: Connection Unit FH 4225

5.4.1 KEYCODE IN

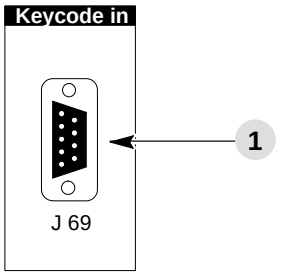
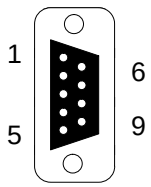


Fig. 507: Part of connection unit FH 4225

Item no.	Socket / Connector Description	Socket type Connector type	Function		
1	J 69 Keycode in	9-pin subminiature D-connector female	RS 232 or RS 422 input (switchable), Interface to read e.g. KEYCODE information for insertion into VITC or LTC user bits.		
			Pin assignment:		
			Pin no.	**RS 422**	**RS 232**
			1	TxB	
			2	TxA	TxD
			3	RxB	RxD
			4	RxB	
			5	Ground	Ground
			6	TxA	
			7	TxB	
			8	RxA	
			9	RxA	



The connection from the keycode reader device (decoder)

EVERTZ:
“Serial I/O” to the keycode reader input of STE-B1 Rack 2 - KEYCODE IN J 69 (9-pin / RS 232).

Cable

Evertz	**Shadow**
Sub-D 9 pin (male)	**Sub-9 pin (male)**
3 ———————————————	2 Tx
2 ———————————————	3 Rx
5 ———————————————	5 GND

ARRI:
"Serial I/O" to the keycode reader input of STE-B1 Rack 2 - KEYCODE IN J 69 (9-pin / RS 232).

Cable

ARRI	**Shadow**
Sub-D 9 pin (male)	**Sub-9 pin (male)**
2	2 Tx
3	3 Rx
5	5 GND

AATON:
"Keylink Com 1" to the keycode reader input of STE-B1 Rack 2 - KEYCODE IN J69 (9-pin / RS 232).

Cable 1

AATON	**Shadow**
Sub-D 25 pin (male)	**Sub-9 pin (male)**
3	2 Tx
2	3 Rx
7	5 GND
25	9

Cable 2 (is part of the AATON Keylink System)
Keylink PC "MTC board top socket" to the bi phase sync signal output of STE-B1 Rack 2 - TC GEN OUT - J 51 (9-pin / control Interface).
Pinning, see chapter 5.4.3.

5.4.2 COLOR FRAME REFERENCE SIGNALS

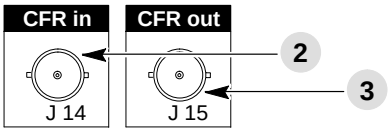


Fig. 508: Part of the connection unit FH 4225 (CFR in / out)

Item no.	Socket / Connector Description	Socket type Connector type	Function
2	J 14 CFR in	BNC connector	Color Frame Reference In TTL input, used by Programmer/Editor systems to synchronize film to tape transfer
3	J 15 CFR out	BNC connector	Color Frame Reference Out TTL output, used for synchronization of Programmer / Editor (e.g. Pogle) Signal details, see also chapter 7.5 Interfaces figure 707.

5.4.3 VARIOUS OUT

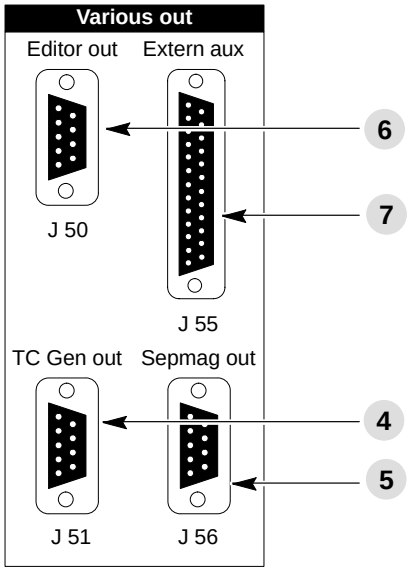
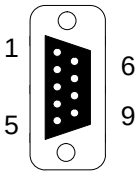
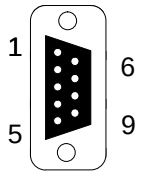
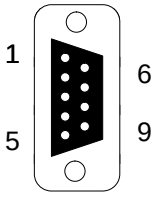
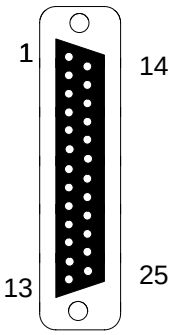


Fig. 509: Part of the connection unit FH 4225 (Rack 2)

Item no.	Socket / Connector Description	Socket type Connector type	Function	
4	J 51 TC Gen out	9-pin subminiature D-connector female 	Timecode generator or keycode reader interface.	
			Pin assignment:	
			Pin no.	**Signals with Capstan Ctrl. FY 6202**
			1	1x or 2x or 10x Bi Phase R Signal
			2	SOF Pulse
			3	not connected
			4	Pre stop
			5	1x or 2x or 10x Bi Phase S Signal
			6	not connected
			7	Ground (Digital)
			8	not connected
			9	+5V (Digital) 300 mA max.
			Signal details, see also chapter Interfaces.	

Item no.	Socket / Connector Description	Socket type Connector type	Function	
5	J 56 Sepmag out	9-pin subminiature D-connector female  	Sepmag interface (two phase interlock signal)	
			Pin assignment:	
			Pin no.	**Signals with Capstan Ctrl. FY 6202**
			1	1x or 2x or 10x Bi Phase R Signal
			2	not connected
			3	not connected
			4	not connected
			5	2x or 2x or 10x Bi Phase S Signal
			6	not connected
			7	Ground (Digital)
			8	not connected
			9	+5V (Digital) 300 mA max.
			Signal details, see also chapter 7.5 Interfaces.	
6	J 50 Editor out	9-pin subminiature D-connector female  	Editor interface Note: Function only with Capstan Control Board FY 6202	
			Pin assignment:	
			Pin no.	**Signals with Capstan Ctrl. FY 6202**
			1	BI Phase R Signal
			2	SOF (Pulldown)
			3	not connected
			4	CFR OUT
			5	BI Phase S Signal
			6	not connected
			7	Ground (Digital)
			8	not connected
			9	+5V (Digital) 300 mA max.
			Signal details, see also chapter Interfaces.	

Item no.	Socket / Connector Description	Socket type Connector type	Function
7	J 55 Extern aux	25-pin subminiature D-connector female	EXTERN AUX is a telecine controller interface based on serial RS 422 standard. It serves to connect the following controller devices with the telecine unit: ● Pogle Pandora ● DaVinci Renaissance ● Sunburst Colorvision



Pin assignment:

Pin no.	Signals
1	Reserved for Film_TC_TxD_A
2	Reserved for Film_TC_TxD_B
3	Film_TC_Common
4	Reserved for Film_TC_RxD_A
5	Reserved for Film_TC_RxD_B
6	SOF_Film_Common
7	Reserved for Studio_TC_TxD_A
8	Reserved for Studio_TC_TxD_B
9	Studio_TC_Common
10	SOF_Film_A
11	SOF_Film_B
12	Reserved for Studio_TC_RxD_A
13	Reserved for Studio_TC_RxD_B
14	not connected
15	Ground
16	SOF_Studio_A
17	SOF_Studio_B
18	SOF_Studio_Common
19	FWD/REV_A (Forward = High)
20	FWD/REV_B
21	+ 5 V (Digital) 300 mA max.
22	not connected
23	not connected
24	not connected
25	not connected

For more signal details, see also chapter Interfaces.

5.4.4 RJ45/IMCS

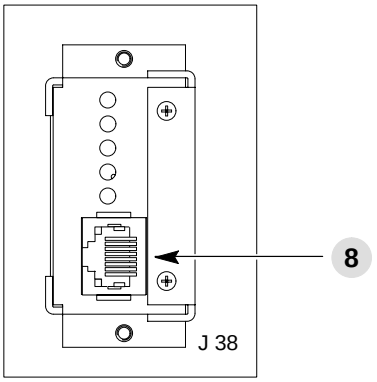


Fig. 510: Part of the connection unit FH 4225 (Rack 2)

Item no.	Socket / Connector Description	Socket type Connector type	Function
8	J 38 iMCS	RJ45 connector female	This RJ45 connector is used to control the telecine via workstation. **ANSI standard** Standard: IEEE 802.3 Data rate: 10 MBit/sec Cable length: max. 100 m Cable type: STP7UTP Category 3 or better Connector: RJ45

5.4.5 REMOTE 4 - 6

(For future use!)

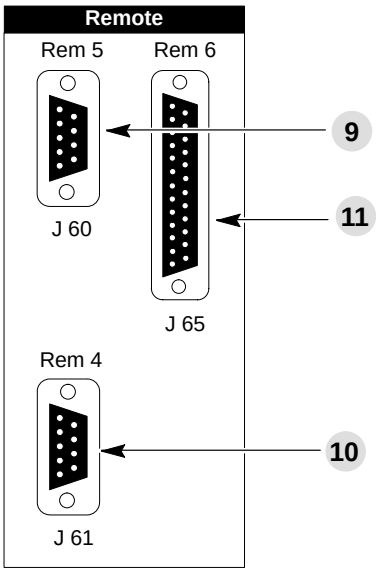
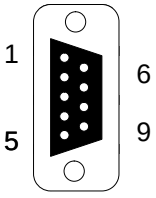
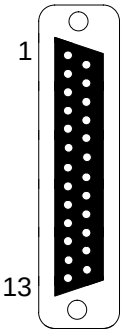


Fig. 511: Part of the connection unit FH 4225 (Remote)

Item no.	Socket / Connector Description	Socket type Connector type	Function	
9 10	J 60 Rem 5 J 61 Rem 4	9-pin subminiature D-connector female 	RS 422 Interface connector not supported	
			Pin assignment:	
			Pin no.	**Signals**
			1	Ground
			2	Transmit A
			3	Receive B
			4	Ground
			5	not used
			6	Ground
			7	Transmit B
			8	Receive A
			9	Ground

Item no.	Socket / Connector Description	Socket type Connector type	Function	
11	J 65 Rem 6	25-pin subminiature D-connector female	Parallel port for external simple control panels referenced to proposed SMPTE recommended practice for D-1 format, dated February 1st, 1989 and adapted to telecine requirements. Command format: active low.	
			Pin assignment:	
			Pin no.	**Signals Parallel (Standard mode)**
			1	Stop SW
			2	Fast FWD SW
			3	Fast rewind SW
			4	Play SW
			5	Play reverse SW
			6	Stop lamp
			7	FWD lamp
			8	Rewind lamp
			9	Play lamp
			10	Play reverse lamp
			11	Ground
			12	Ground
			13	Data out 7
			14	Step FW SW
			15	Step RV SW
			16	Step FW lamp
			17	Step RV lamp
			18	Status 1
			19	Status 2
			20	Status 3
			21	Status 4
			22	Data in 7
			23	Data out 12
			24	+ 5 V (maximum current 750 mA / R_i = 0,4Ω)
			25	+ 5 V (maximum current 750 mA / R_i = 0,4Ω)



Note: - all switch pins go to +5V trough 1k Ohm
- all lamp feeds are 5V.

5.4.6 WAVEFORM MONITORING

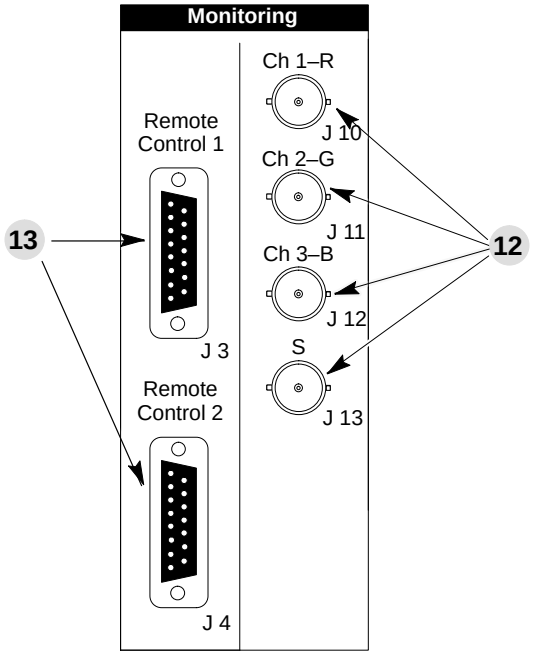
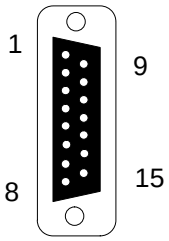


Fig. 512: Part of the connection unit FH 4225 (Rack 2)

Item no.	Socket / Connector Description	Socket type Connector type	Function
12	J 10 - J 13 CH 1-R, CH 2-G, CH 3-B, S Monitoring output	BNC connector	One set of analog outputs for connection of wave form monitors. (Level adjustable on board FY 1408 via pot to equalize different cable length). Diagram for correct cabling is described in chapter 3. System Applications section 3.9 Waveform Monitoring.

<table>
<tr><th>Item no.</th><th>Socket / Connector Description</th><th>Socket type Connector type</th><th>Function</th></tr>
<tr><td>13</td><td>J 3
Remote Control 1
J 4
Remote Control 2</td><td>15-pin subminiature D-connector female
 
</td><td>For remote control of waveform monitor
Cable Length max. 50m
Sustained types of waveform monitors are:
● Philips PT 5464 HD
all standards, waveform and vector display
● Philips PT 5664 SDTV
Note!
Disconnect pin 1 of the control cable PT 5664, otherwise the remote control functions are disturbed.
● TEK 1735/1730 HD
SDTV & HDTV, 2x3 BNC inputs available
● TEK 1740/1750/1760 SDTV
Storing the presets - via menu MONITORING F11 preset WFM “Preset for WFM 300” F10 STORE - is not supported. Use the front control panel for storing presets. Create a connection cable, see table 500 on page 5-22.
● TEK WFM 300/300A SDTV only
Pin assignment:
<table>
<tr><th>Pin no.</th><th>Remote Control 1</th><th>Remote Control 2</th></tr>
<tr><td>1</td><td>WFM-CTRL1-1</td><td>WFM-CTRL2-1</td></tr>
<tr><td>2</td><td>WFM-CTRL1-2</td><td>WFM-CTRL2-2</td></tr>
<tr><td>3</td><td>WFM-CTRL1-3</td><td>WFM-CTRL2-3</td></tr>
<tr><td>4</td><td>WFM-CTRL1-4</td><td>WFM-CTRL2-4</td></tr>
<tr><td>5</td><td>WFM-CTRL1-5</td><td>WFM-CTRL2-5</td></tr>
<tr><td>6</td><td>WFM-CTRL1-6</td><td>WFM-CTRL2-6</td></tr>
<tr><td>7</td><td>WFM-CTRL1-7</td><td>WFM-CTRL2-7</td></tr>
<tr><td>8</td><td>WFM-CTRL1-8</td><td>WFM-CTRL2-8</td></tr>
<tr><td>9</td><td>WFM-GND1</td><td>WFM-GND2</td></tr>
<tr><td>10</td><td>WFM-CTRL1-10</td><td>WFM-CTRL2-10</td></tr>
<tr><td>11</td><td>WFM-CTRL1-11</td><td>WFM-CTRL2-11</td></tr>
<tr><td>12</td><td>WFM-CTRL1-12</td><td>WFM-CTRL2-12</td></tr>
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<tr><td>15</td><td>WFM-CTRL1-15</td><td>WFM-CTRL2-15</td></tr>
</table>
</td></tr>
</table>

Output drivers opto coupler PC 354 see chapter 7. Interfaces

Connection cable for waveform monitors type TEK 1740/1750/1760.

15-pin subminiature D-connector male	25-pin subminiature D-connector male	Function
pin 9	pin 14	GND
pin 5	pin 18	Recall 2 Superimposed
pin 6	pin 19	Recall 3 Vector
pin 7	pin 17	Recall 1 Parade

Table 500: Connection cable WFM

5.4.7 PULSES OUT

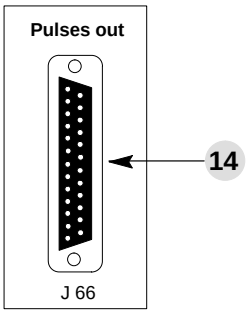
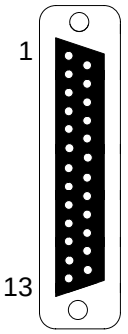


Fig. 501: Part of the connection unit FH 4225 (Rack 2)

Item no.	Socket / Connector Description	Socket type Connector type	Function
14	J 66 Pulses out	25-pin subminiature D-connector female	”Pulses out” is a general purpose pulse output connector with telecine internal synchronization pulses. It serves to connect the SCREAM Grain Reducer with the telecine unit: All signals ECL-Level (**E**mitter **C**oupled **L**ogic)

Item no.	Socket / Connector Description	Socket type Connector type	Function	
14	J 66 Pulses out	25-pin subminiature D-connector female	**Pin assignment:**	
			Pin no.	**Signals**
			1	CLK 120 MHz
			2	Ground (CLK 120 MHz)
			3	CLK 60 MHz
			4	Ground
			5	SOL Start of Line horizontal synchronization pulse
			6	Ground (SOL)
			7	IOL Increment of Lines film speed synchronization pulse
			8	Ground
			9	not connected
			10	not connected
			11	SOF Start of Frame vertical synchronization pulse
			12	not connected
			13	not connected
			14	$\overline{\text{CLK 120}}$ MHz
			15	Ground (CLK 60 MHz)
			16	$\overline{\text{CLK 60}}$ MHz
			17	Ground
			18	$\overline{\text{SOL}}$ Start of Line horizontal synchronization pulse
			19	Ground (IOL)
			20	$\overline{\text{IOL}}$ Increment of Lines film speed synchronization pulse
			21	Ground
			22	not connected
			23	Ground (SOF)
			24	$\overline{\text{SOF}}$ Start of Frame vertical synchronization pulse
			25	not connected



5.4.8 INTERNAL CONNECTIONS

The following table describes the internal cabling from rack to rack as well as the cabling to the individual subassemblies in the Shadow. The internal cabling must be changed by our service personnel only.

The table is only important for the service personnel and serves at this place only for the information of the customer.

Item no.	Socket / Connector Description	Connected to	Cable (set)
1	J 2, Monitoring HDTV R3	J 56, Monitoring HDTV R2 on Connection Unit FH 6325 Rack 3	FH 4057 Upgrade Cable Set Monitoring HDTV R3
2	J 9, Monitoring SDTV R3	J 55, Monitoring SDTV R2 on Connection Unit FH 6325 Rack 3	FH 4057 Upgrade Cable Set Monitoring SDTV R3
3	J 37, Data out B	J 59, Data in B on Connection Unit FH 6325 Rack 3	FH 4057 Upgrade Cable Set Data B
4	J 38, iMCS 1	Port 6, AT-MR820TR Ethernet 10Base-T Micro HUB	10Base_T_R2_1_FDC
5	J 40, Data out G	J 58, Data in G on Connection Unit FH 6325 Rack 3	FH 4057 Upgrade Cable Set Data G
6	J 41, Data out R	J 57, Data in R on Connection Unit FH 6325 Rack 3	FH 4057 Upgrade Cable Set Data R
7	J 45, Data in B1	J 7, Data out B1 on Connection Unit FH 4125 Rack 1	Data B1
8	J 46, Power Hub	not used	
9	J 47, Data in G1	J 6, Data out G1 on Connection Unit FH 4125 Rack 1	Data G1
10	J 48, Sprocket in	FH 6018 Sprocket Wheel Pulse Tacho	Sprocket in
11	J 49, Power Fan 1	J 1, FH 6350 Fan Unit Rack 2 (1st generation) or FH 4255 (2nd generation)	Power Fan 1 R2
12	J 52, Data in R1	J 5, Data out R1 on Connection Unit FH 4125 Rack 1	Data R1
13	J 53, Spooling I/O	J 4, FX 1026 Spooling Power Amplifier	Spooling I/O
14	J 54, Power Fan 2	J 1, FH 4250 Rear Fan Unit Rack 2	Power Fan 2 rear R2
15	J 57, Data in R2 G2 B2	J 8, Data out R2 G2 B1 on Connection Unit FH 4125 Rack 1	Data R2 G2 B2
16	J 58, Local Panel	J 1, FH 4500 Local Control Panel	Local Panel
17	J 59, Filmdeck I/O	J 1, FY 6011 Intermediate Board	Filmdeck I/O

Item no.	Socket / Connector Description	Connected to	Cable (set)
18	J 62, Ctrl Assy R1	J 19, Ctrl Assy R2 on Connection Unit FH 4125 Rack 1	Control Assy R1/R2
19	J 63, Ctrl Assy R3	J 48, Ctrl Assy R2 on Connection Unit FH 6325 Rack 3	FH 4057 Upgrade Cable Set Control Assy R2/R3
20	J 64, Capstan I/O	J 1, FD 2 ST 9 A Capstan Servo Power Stage	Capstan I/O
21	J 67, Pulses-1 R3/R2	J 49, Pulses-1 R2 on Connection Unit FH 6325 Rack 3	FH 6056 Multiclock Cable Set RR Multiclock Cable 2
22	J 68, Tension R	J 1, FX 6015 Film Tension Board Right	FH 1043 Wire Set Filmdeck Tension R
23	J 72, Pulses R1	J 3, Film Pulses on Connection Unit FH 4125 Rack 1	FH 6056 Multiclock Cable Set Multiclock Cable
24	J 73, Pulses-2 R3/R2	J 50, Pulses-2 R2 on Connection Unit FH 6325 Rack 3	FH 6056 Multiclock Cable Set RR Multiclock Cable 2
25	J 74, Tension L	J 1, FX 6015 Film Tension Board Left	FH 1043 Wire Set Filmdeck Tension L

5.5 CONNECTION UNIT FH 6325 RACK 3

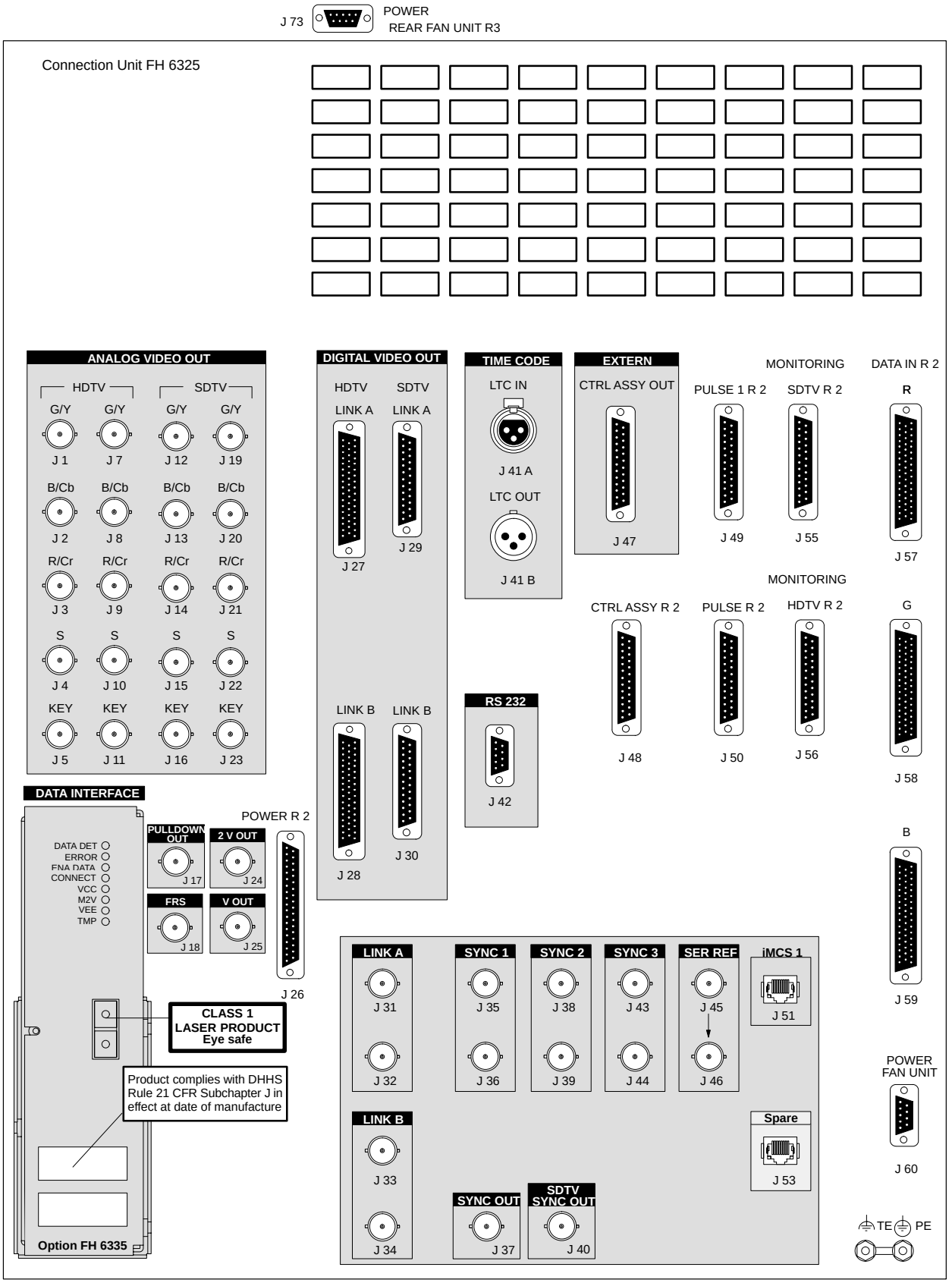


Fig. 502: Connection Unit FH 6325

5.5.1 ANALOG VIDEO OUT

(HDTV Output only with option FH 1675)

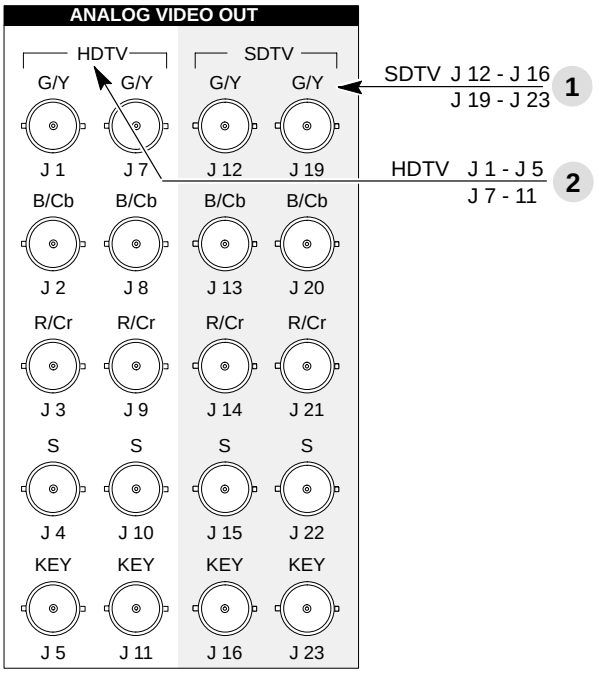


Fig. 503: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
1 2	J 12 - J 16, J 19 - J 23 SDTV video outputs J 1 - J 5, J 7 - J 11 HDTV video outputs	BNC connector	**HDTV & SDTV** 2 x 5 BNC connectors R, G, B, S, K, switchable to Y, C_B, C_R, S, K independent of the digital output SYNC signal in G-, Y-channel, switchable ON/OFF SYNC signal in R-, B-, C_R-, C_B-channel, switchable ON/OFF Always 4x4 output EDTV/SDTV resolution. In 8:4:4 mode EDTV 4x4 resolution. All these BNC are outputs of analog picture signals. The analog blanking width is corresponding to SMPTE or CCIR. For all analog outputs it is possible to switch off the blanking (menu VIDEO). For the luminance –, the key – and the green signal it is possible to switch transparency the vertical blanking for a stamped-in VITC signal (menu VIDEO). **Signal** level (+ sync): 0.7 V_{PP} (+ 0.3 V_{PP}) Impedance: 75 ohm Return loss: > 35 dB min. **Sync** level: 4 V_{PP} for SDTV (Bilevel), ± 0.3 V for HDTV (Trilevel), Impedance: 75 ohm Return loss: > 26 dB min.

Item no.	Socket / Connector Description	Socket type Connector type	Function	
1			**RGB for SDTV operating**	**Components for SDTV operating**
	J 12, J 19	BNC connector	G: Green component	Y: Luminance signal
	J 13, J 20		B: Blue component	C_B: Blue color-difference signal
	J 14, J 21		R: Red component	C_R: Red color-difference signal
	J 16, J 23		K: Key signal	–
	J 15, J 22		S: Bilevel synchronization signal	S: Bilevel synchronization signal 4 V_{PP}
2			**RGB for HDTV operating**	**Components for HDTV operating**
	J 1, J 7	BNC connector	G: Green component	Y: Luminance signal
	J 2, J 8		B: Blue component	C_B: Blue color-difference signal
	J 3, J 9		R: Red component	C_R: Red color-difference signal
	J 5, J 11		K: Key signal	–
	J 4, J 10		S: Trilevel synchronization signal	S: Trilevel synchronization signal

5.5.2 DIGITAL VIDEO OUT

5.5.2.1 SDTV (EDTV / 8:4:4)*

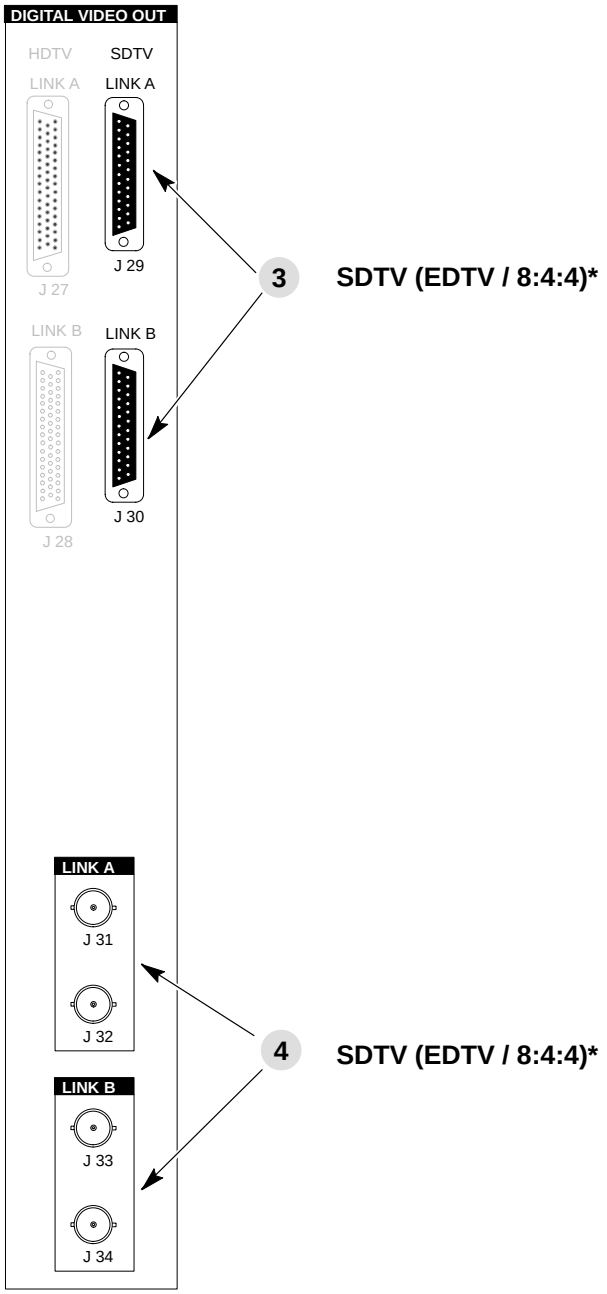


Fig. 504: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
3	J 29 Link A (parallel data) J 30 Link B (parallel data)	25-pin subminiature D-connector female	**SDTV / EDTV parallel data** Link A / B SDTV 4:2:2 CCIR 656 or 4x4 format (EDTV / 8:4:4 prepared) Digital Video Outputs for the SDTV Data feed to any other 4:4:4(:4) SDTV signal processor like noise reducer or color corrector. Operation mode switchable, same mode at serial and parallel output. R, G, B, K or Y, C_B, C_R, K switchable between 10 bit and 8 bit with static rounding. See item number 4 Link A / Link B serial data outputs.
			Link A (parallel data)
			● 4:2:2 CCIR 656, Y , C_B / C_R or ● 4:2:2:4 Y, C_B, / C_R or ● 4x4, Y , C_{B0} / C_{R0} or ● 4x4, G , B_0 / R_0 or ● 8:4:4, Y_0, C_{B0} / C_{R0}
			Link B (parallel data)
			● 4:2:2·CCIR 656 Y , C_B / C_R or ● 4:2:2:4 K, 0/0 or ● 4x4 K , C_{B1} / C_{R1} or ● 4x4 K , B_1 / R_1 or ● 8:4:4· Y_1 , C_{B1} / C_{R1}
4	J 31, J 32 Link A (serial data) J 33, J 34 Link B (serial data)	BNC-connector, Serial 270/360 MBit/s, CCIR 656	**SDTV / EDTV CCIR 656 serial data** EBU TECH 3267-E EBU TECH 3268-E SMPTE T14.22

5.5.2.2 HDTV Outputs Parallel

(Only with option FH 4069 HDTV Output)

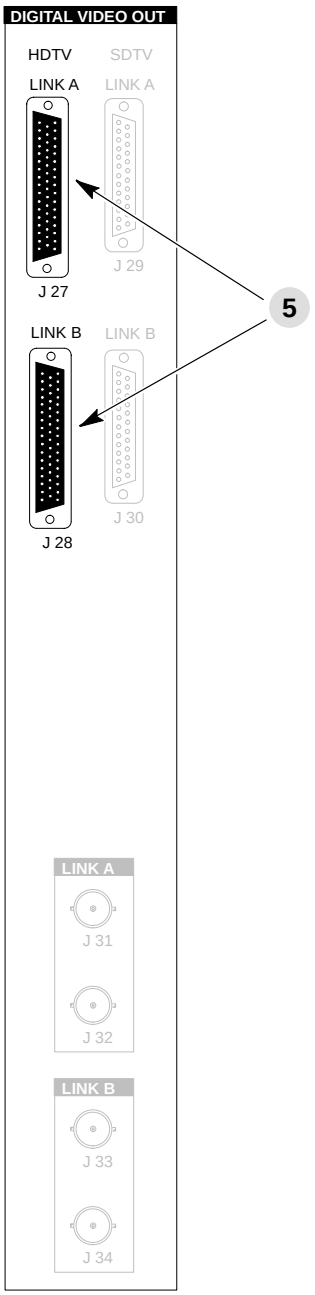


Fig. 505: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
5	J 27 HDTV out Link A (parallel video data) J 28 HDTV out Link B (parallel video data)	50-pin subminiature D-connector female	**HDTV parallel video data** Operation mode switchable - 2x 4:2:2 - 4x4 - 4:2:2:4, Key signal on Link B R, G, B, K or Y, C_B, C_R, K. Switchable between 10 bit and 8 bit with static rounding. Clock and data timing according to CCIR or EU 95. Pinning according to CCIR TG11. Cable adapter for EU 95, SMPTE 260M and SMPTE 274M necessary
			CCIR Link A
			● **4:2:2** **Y, C_B / C_R** or ● 4:2:2:4 Y, C_B / C_R or ● 4x4 Y, C_{B0} / C_{R0} or ● 4x4 G, B_0 / R_0 or ● 4x4 G, R or ● 8:8:8 Y, C_R or ● 8:8:8 G, R
			CCIR Link B
			● **4:2:2** **Y, C_B / C_R** or ● 4:2:2:4 K, 0/0 or ● 4x4 K, C_{B1} / C_{R1} or ● 4x4 K, B_1 / R_1 or ● 4x4 K, B or ● 8:8:8 K, C_B or ● 8:8:8 K, B
			CCIR Link A/B **Y, C_B, C_R** Digital parallel interface, pinning according to CCIR Document TG 11/1–11/2 for the **HDTV Y/C Signal 4:2:2**. DATA0...9 (MSB) used for the luminance signal Y DATA10...19 (MSB) used for the chrominance signal C_R C_B (8/10 bit mode switchable)

Item no.	Socket / Connector Description	Socket type Connector type	Function
5			**Coding & Data format** **Details of the video data connector CCIR Y/C**

TV Standard	Coding + Data format	Clock
1250/50	CCIR TG 11/1–11/2 or EU 95–PG02/03	36 MHz
1125/60	SMPTE 260M	74.25 MHz
1125/59.94	SMPTE 260M	74.18 MHz
1920x1080/60	SMPTE 274M	74.25 MHz
1920x1080/59.94	SMPTE 274M	74.18 MHz
1280x720/60P only with Option DTV FH 4066	SMPTE 296 M	74.25 MHz
1208x720/59.94P only with Option DTV FH 4066	SMPTE 296 M	74.18 MHz

Pin assignment
The 20 bits in each data word for the **1250/1125 - 1920x1080** signals are denoted data 00 to 19. Data 19 is the MSB (most significant bit) of the color difference data while data 09 is the MSB of the luminance data. The electrical specifications of the Video Data I/O connector are identically to EU-95 standard.
Mechanical pinning, according to CCIR Documentation TG 11/1 – TG 12/1, see table below

Contact	Bit no.	Signal	Contact	Bit no.	Signal	Contact	Bit no.	Signal
1	-	clk a				34	-	clk b
2	19	data 09a	18	-	gnd	35	19	data 09b
3	18	data 08a	19	-	gnd	36	18	data 08b
4	17	data 07a	20	11	data 01a	37	17	data 07b
5	16	data 06a	21	11	data 01b	38	16	data 06b
6	15	data 05a	22	10	data 00a	39	15	data 05b
7	14	data 04a	23	10	data 00b	40	14	data 04b
8	13	data 03a	24	-	gnd	41	13	data 03b
9	12	data 02a	25	-	gnd	42	12	data 02b
10	9	data 19a	26	-	gnd	43	9	data 19b
11	8	data 18a	27	-	gnd	44	8	data 18b
12	7	data 17a	28	1	data 11a	45	7	data 17b
13	6	data 16a	29	1	data 11b	46	6	data 16b
14	5	data 15a	30	0	data 10a	47	5	data 15b
15	4	data 14a	31	0	data 10b	48	4	data 14b
16	3	data 13a	32	-	gnd	49	3	data 13b
17	2	data 12a	33	-	gnd	50	2	data 12b

Fig. 506: Pinning of Data I/O Connector CCIR Y/C

5.5.2.3 HDTV Outputs Serial

(Only with option FH 4069 HDTV Output)

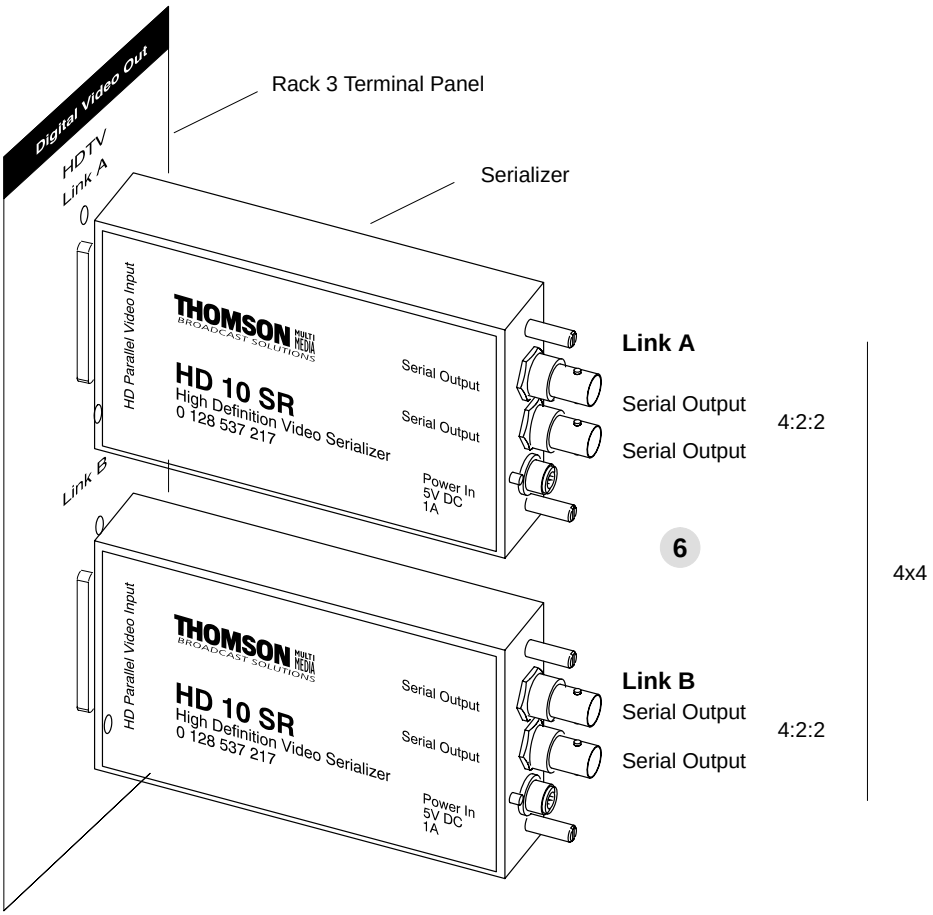


Fig. 507:

Item no.	Socket / Connector Description	Socket type Connector type	Function
6	J 27 HDTV out Link A (serial video data) J 28 HDTV out Link B (serial video data)	2x BNC-connector 75 Ω 2x BNC-connector 75 Ω	**HDTV serial video data** Operation mode switchable - 2x 4:2:2 - 4x4 - 4:2:2:4, Key signal on Link B R, G, B, K or Y, C_B, C_R, K. Switchable between 10 bit and 8 bit with static rounding. HD SDI Video Out according to SMPTE - 292M, 1.485 and 1.485/1.001 Gb/s

Item no.	Socket / Connector Description	Socket type Connector type	Function
6	J 27 HDTV out Link A (serial video data) J 28 HDTV out Link B (serial video data)	2x BNC-connector 75 Ω 2x BNC-connector 75 Ω	**CCIR Link A** ● **4:2:2** **Y, C_B / C_R** or ● 4:2:2:4 Y, C_B / C_R or ● 4x4 Y, C_{B0} / C_{R0} or ● 4x4 G, B_0 / R_0 or ● 4x4 G, R **CCIR Link B** ● **4:2:2** **Y, C_B / C_R** or ● 4:2:2:4 K, 0/0 or ● 4x4 K, C_{B1} / C_{R1} or ● 4x4 K, B_1 / R_1 or ● 4x4 K, B **HDTV standards** ● 1280 x 720 / 60 Hz progressive ● 1280 x 720 / 59.94 Hz progressive ● 1920 x 1080 / 24 Hz progressive ● 1920 x 1080 / 23.98 Hz progressive ● 1920 x 1080 / 25 Hz progressive ● 1920 x 1080 / 24 segmented frame ● 1920 x 1080 / 23.98 segmented frame ● 1920 x 1080 / 50 interlaced 2:1 ● 1920 x 1125 / 60 interlaced 2:1 ● 1920 x 1125 / 59.94 interlaced 2:1 ● 1920 x 1125 / 60 interlaced 2:1 ● 1920 x 1080 / 59.94 interlaced 2:1 **Restrictions** 1920 x 1250 / 50 interlaced 2:1 is not supported.

5.5.3 SYNC PULSES OUTPUTS

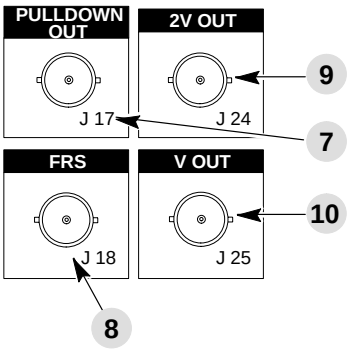


Fig. 508: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
7	J 17 Pulldown out	BNC-connector	“Telecine Frame Pulse” for a key code reader/ time code reader / generator TTL level (for more details see chapter 7. Interfaces)
8	J 18 FRS	BNC-connector	The FRS (Freeze Signal) is used to mark repeated fields TTL level
9	J 24 2V out	BNC-connector	TTL pulse for test and alignment
10	J 25 V out	BNC-connector	TTL pulse for test and alignment

5.5.4 EXTERNAL REFERENCE INPUTS

For synchronization of the telecine.

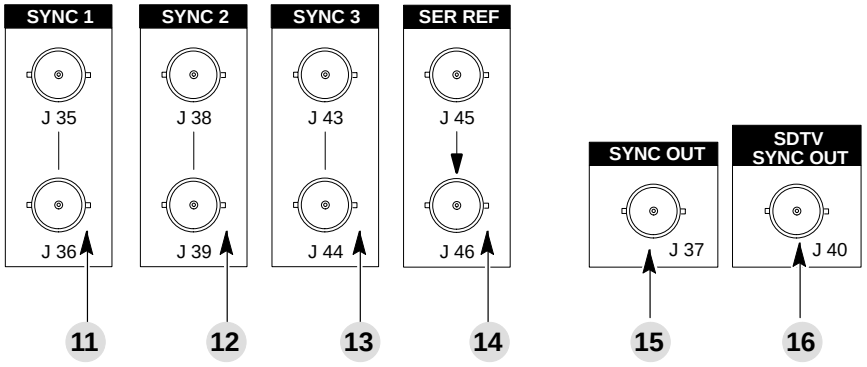


Fig. 509: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
11	J 35, J 36 Sync 1	BNC-connector	Loop input 1 for an analog studio reference SDTV: bilevel 0,3 V_{ss} - 4 V_{ss} HDTV: trilevel 0,6 V_{ss}
12	J 38, J 39 Sync 2	BNC-connector	Loop input 2 for an analog studio reference SDTV: bilevel 0,3 V_{ss} - 4 V_{ss} HDTV: trilevel 0,6 V_{ss}
13	J 43, J 44 Sync 3	BNC-connector	Loop input 3 for an analog studio reference SDTV: bilevel 0,3 V_{ss} - 4 V_{ss} HDTV: trilevel 0,6 V_{ss}
14	J 45, J 46 Ser Ref	BNC-connector	4:2:2 serial, 270 Mbit/s (CCIR 656) ECL Level 270 MHz 800 mV
15	J 37 Sync out	BNC-connector	Sync output reflects the level of the selected EXT REF signal Sync 1 - 3.
16	J 40 SDTV Sync out	BNC-connector	Bilevel SDTV sync pulse 625 / 525 / 651 lines at 25 / 30 / 24 Hz frame rates also in HDTV and data mode Unterminated 4 V_{ss} Terminated with 75 Ω 2 V_{ss} Especially designed for the vertical synchronization of telecine controllers.

Note:

The Sync input is selected by the control panel menu Setup, F7 ”Genlock Settings”, Genlock ref-sync-select.

Note!
For external synchronization of the Shadow Telecine an appropriate sync signal has to be provided.
In case of SDTV standards an analog bilevel SDTV - sync signal or a serial digital SDI - signal are applicable.

Synchronization of HDTV
For (H)DTV applications an analog trilevel (H)DTV - sync has to be applied. This external sync signal must be fully compliant to the selected (H)DTV standard.

Note!
Synchronization of (H)DTV operating modes to SDTV sync signals is not supported (not possible).
For example, the V sync of the 625/50 standard can not be used in the Shadow Telecine for synchronizing the (H) DTV standard 1920 x 1080 **25p.**

5.5.5 TIME CODE

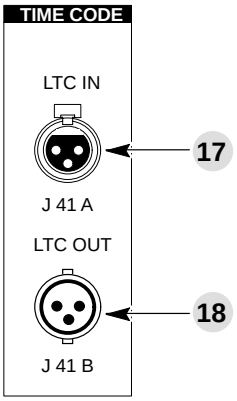


Fig. 510: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
17	J 41 A LTC in	XLR female	XLR input connector Interface for ARRI film time code information
18	J 41 B LTC out	XLR male	XLR output connector LTC (linear timecode) compatible to the standard SMPTE 12M.

5.5.6 CONTROLS

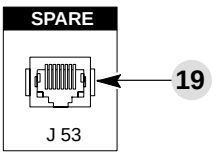


Fig. 511: Part of the connection unit FH 4225 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
19	J 53 Spare	RJ45 connector	Connected to option Data Output Board FY 6345 but not supported! (for future use)

5.5.7 IMCS 1

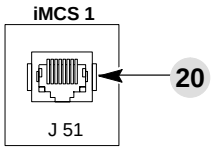


Fig. 512: Part of the connection unit FH 4225 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
20	J 51 iMCS 1	RJ45 connector	This RJ45 connector is used to extend the iMCS 1 - bus for connecting Graphical Control Panel, Diagnostic PC or telecine controller. Details about the standard see chapter 7. “Interfaces RJ45/iMCS”.

5.5.8 RS 232 INTERFACE

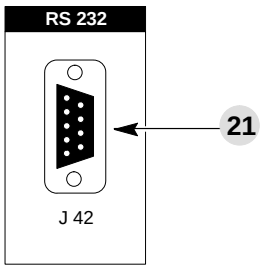


Fig. 513: Part of the connection unit FH 4225 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
21	J 42 RS 232	9-pin subminiature D-connector female	Serial RS 232 interface port for test and alignment purposes.

5.5.9 EXTERN, CONTROL ASSY OUT

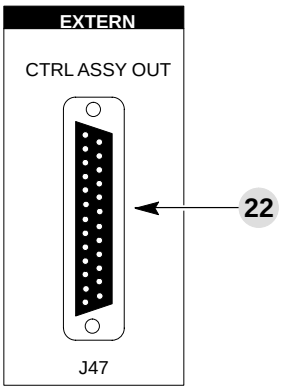


Fig. 514: Part of the connection unit FH 4225 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
22	J 47 Ctrl Assy Out	9-pin subminiature D-connector female	Daisy chain Connection to external Racks.

5.5.10 DATA INTERFACE

5.5.10.1 FH 6335 HIPPI Serial Interface

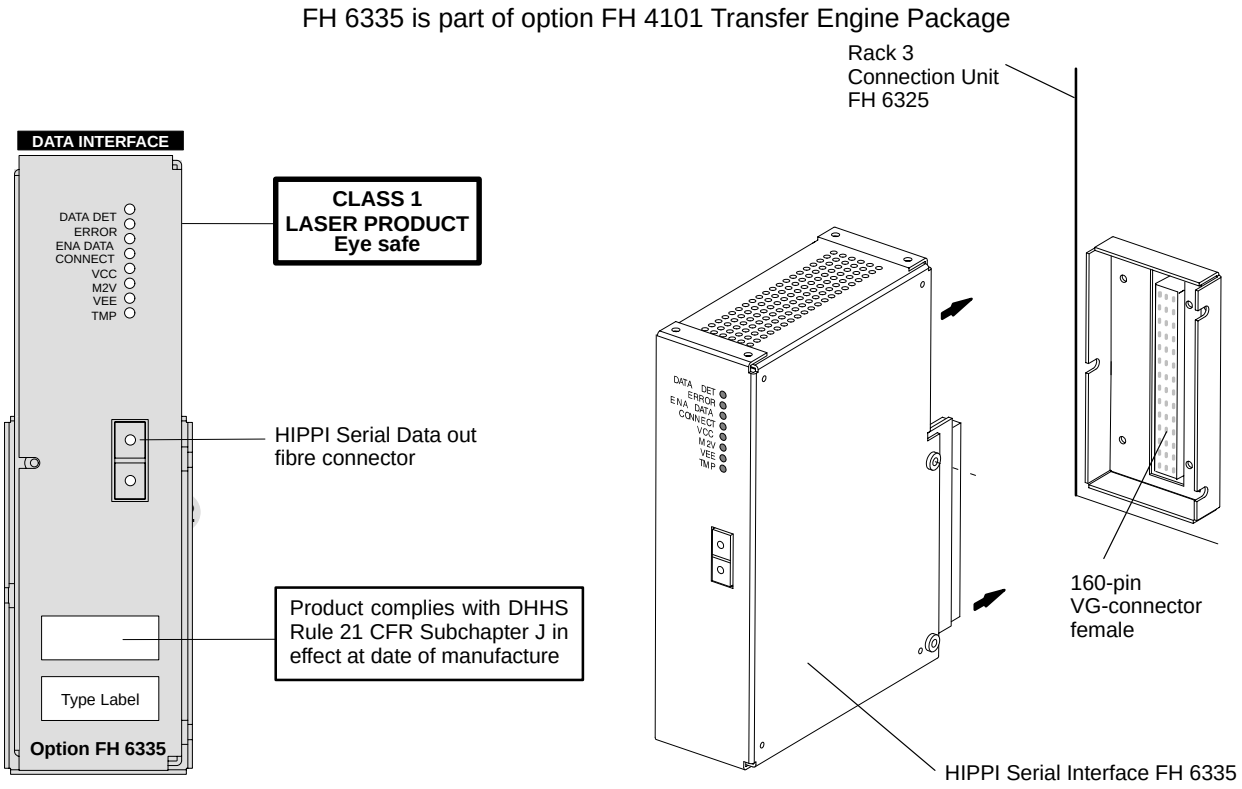


Fig. 515: Part of the connection unit FH 6325 (Rack 3)

Item no.	Socket / Connector Description	Socket type Connector type	Function
23	Serial Data out	Fibre connector female	It provides a means of high-speed data transmission via a pair of fiber optic cables. The Serial Interface is intended to be used where cable lengths up to 500 m are required. Multi-Mode Fibre Cable Manufacturer: ***AMP*** *Order No.: 349565 SC - Duplex* Cable: Type 50/125 µm MMF Length max. 500 m Bandwidth min. 500 MHz *km @ 780 nm Optical loss: max. 4 dB / km Connectors: Type SC duplex Mean loss max. 0.11 dB Standard deviation loss 0.15 dB Optical return loss min. 20 dB Number of connectors max. 8 between two transceivers

5.5.11 INTERNAL CONNECTIONS

The following table describes the internal cabling from rack to rack as well as the cabling to the individual subassemblies in the Shadow. The internal cabling must be changed by our service personnel only.

The table is only important for the service personnel and serves at this place only for the information of the customer.

Item no.	Socket / Connector Description	Connected to	Cable (set)
1	J 26, Power R2	not used	
2	J 48, Ctrl Assy R2	J 63, Ctrl Assy R3 on Connection Unit FH 4225 Rack 2	FH 4057 Upgrade Cable Set Control Assy R2/R3
3	J 49, Pulse-1 R2	J 67, Pulses-1 R3/R2 on Connection Unit FH 4225 Rack 2	FH 6056 Multiclock Cable Set RR Multiclock Cable 2
4	J 50, Pulse R2	J 73, Pulses-2 R3/R2 on Connection Unit FH 4225 Rack 2	FH 6056 Multiclock Cable Set RR Multiclock Cable 2
5	J 51, iMCS	Port 4, AT-MR820TR Ethernet 10Base-T Micro HUB	10Base_T_R3
5	J 55, Monitoring SDTV R2	J 9, Monitoring SDTV R3 on Connection Unit FH 4225 Rack 2	FH 4057 Upgrade Cable Set Monitoring SDTV R3
6	J 56, Monitoring HDTV R2	J 2, Monitoring HDTV R3 on Connection Unit FH 4225 Rack 2	FH 4057 Upgrade Cable Set Monitoring HDTV R3
7	J 57, Data in R	J 41, Data out R on Connection Unit FH 4225 Rack 2	FH 4057 Upgrade Cable Set Data R
8	J 58, Data in G	J 40, Data out G on Connection Unit FH 4225 Rack 2	FH 4057 Upgrade Cable Set Data G
9	J 59, Data in B	J 37, Data out B on Connection Unit FH 4225 Rack 2	FH 4057 Upgrade Cable Set Data B
10	J 60, Power Fan Unit	J 1, FH 6350 Fan Unit Rack 3 (1st generation) or FH 4255 (2nd generation)	FH 4057 Upgrade Cable Set Power Fan 1 R3
11	J 73, Power Rear Fan Unit	J 1, FH 4250 Rear Fan Unit Rack 3	FH 4057 Upgrade Cable Set Power Fan 2 Rear R3

5.6 IMCS CONNECTIONS (RJ45)

The Ethernet 10Base-T Micro HUB is mounted in the rear of the unit over the racks 2 and 3. See chapter 4.16, figure 435 “Location of the Subunits”. The Micro HUB is internally connected with the iMCS connectors of the racks 1 – 3. External devices have to be connected via the four RJ45 connectors of the terminal panel.

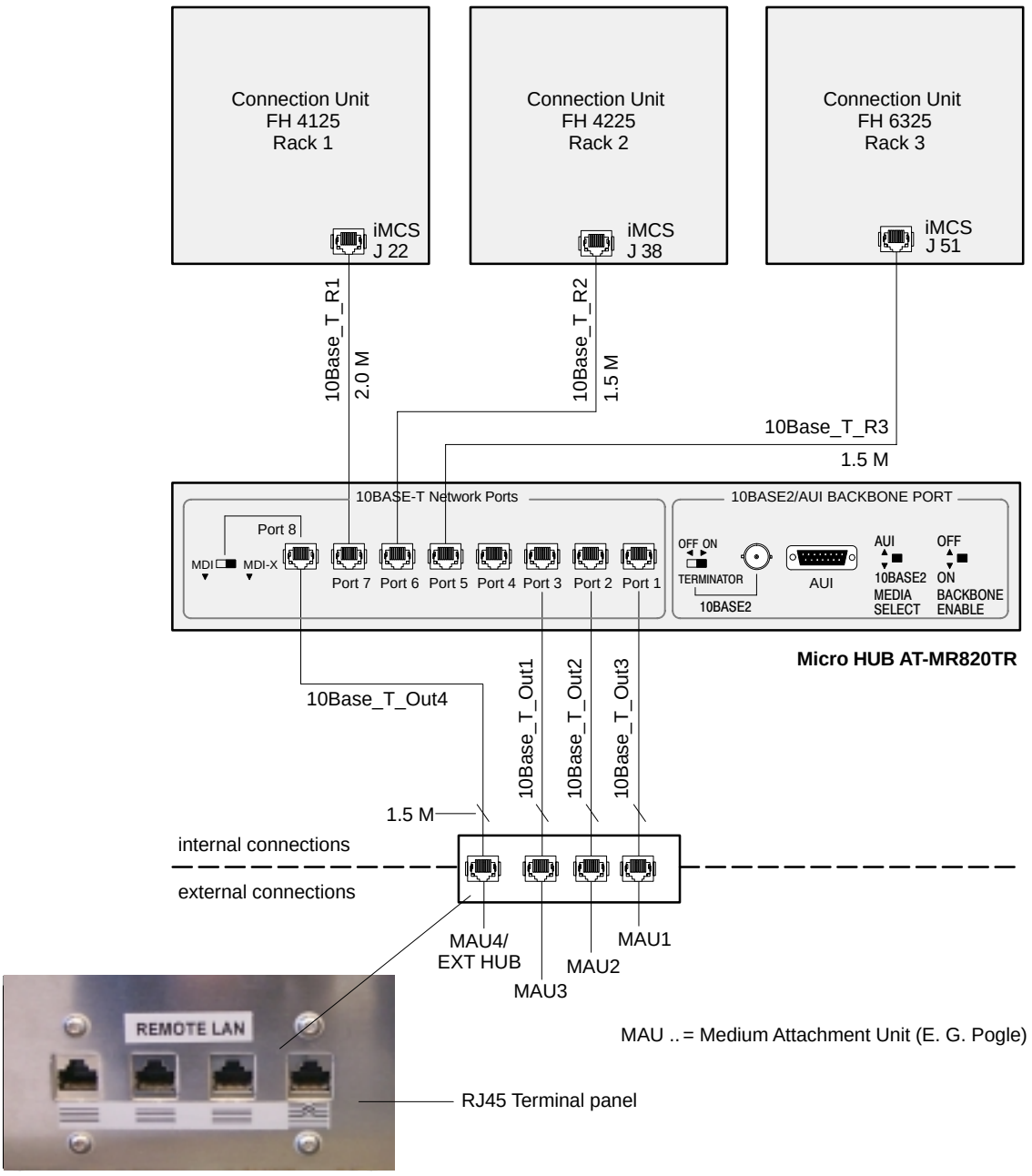


Fig. 516: Internal and external RJ45 connections

On the Micro HUB AT-MR820TR there is also a **10Base2** port (BNC connector) available.

Important 50 Ω terminator settings!

10Base2 port unconnected

- If the 10Base2 port (BNC connector) is not used, switch the TERMINATOR to "**ON**" and plug in an additional 50 Ω terminator.
  Otherwise the internal communication via the HUB could be disturbed.

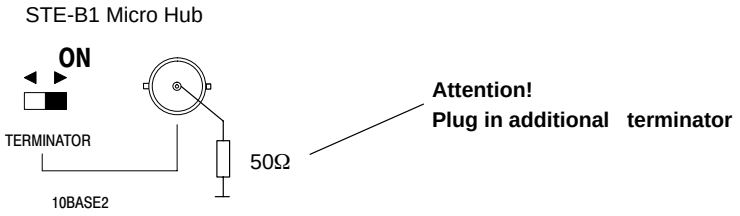


Fig. 517:

10Base2 port as one bus end connected

- If this connector will be used and realized as one end of the external iMCS bus, e.g. for a telecine controller, make sure that the port is terminated (50 Ω at each side).
  Set TERMINATOR switch to "**ON**". Also switch MEDIA SELECT and BACK-BONE ENABLE to "**ON**".

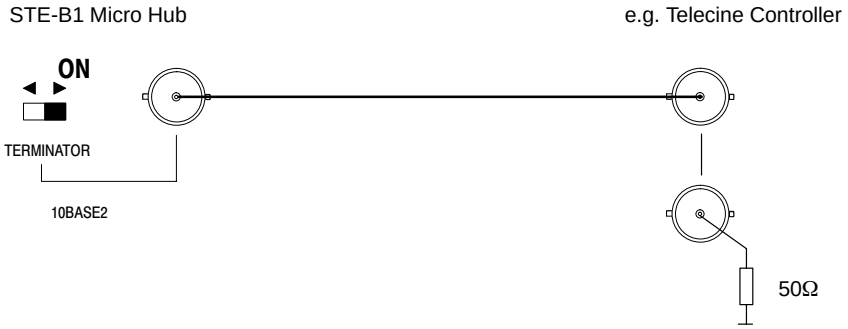


Fig. 518:

10Base2 port via BNC T-connector connected

- In case the 10Base2 port is is used as part of a iMCS bus via a BNC T-connector (e.g. for a service PC with SDCMAINT) then set TERMINATOR to “**OFF**”.

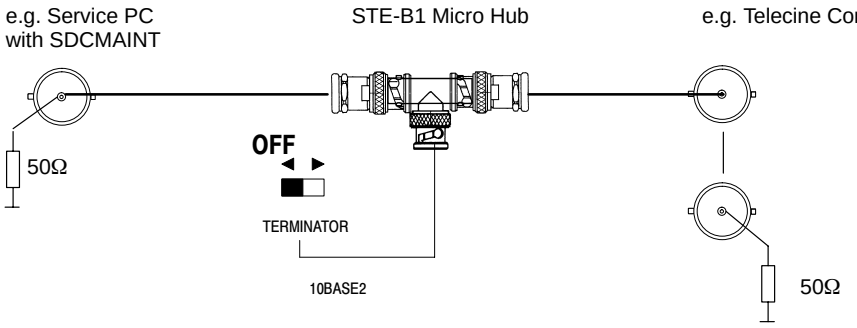


Fig. 519:

Note:

If external HUB connected, set MDI/MDI-X switch on internal HUB to MDI-X or use crossed RJ45 patch cable.

6. OPERATIONAL CONTROLS

This section describes switches, test points and LEDs of all boards within Rack 1-3.

6.1 RACK 1 AUDIO ILLUMINATION-FILM PREPROCESSING

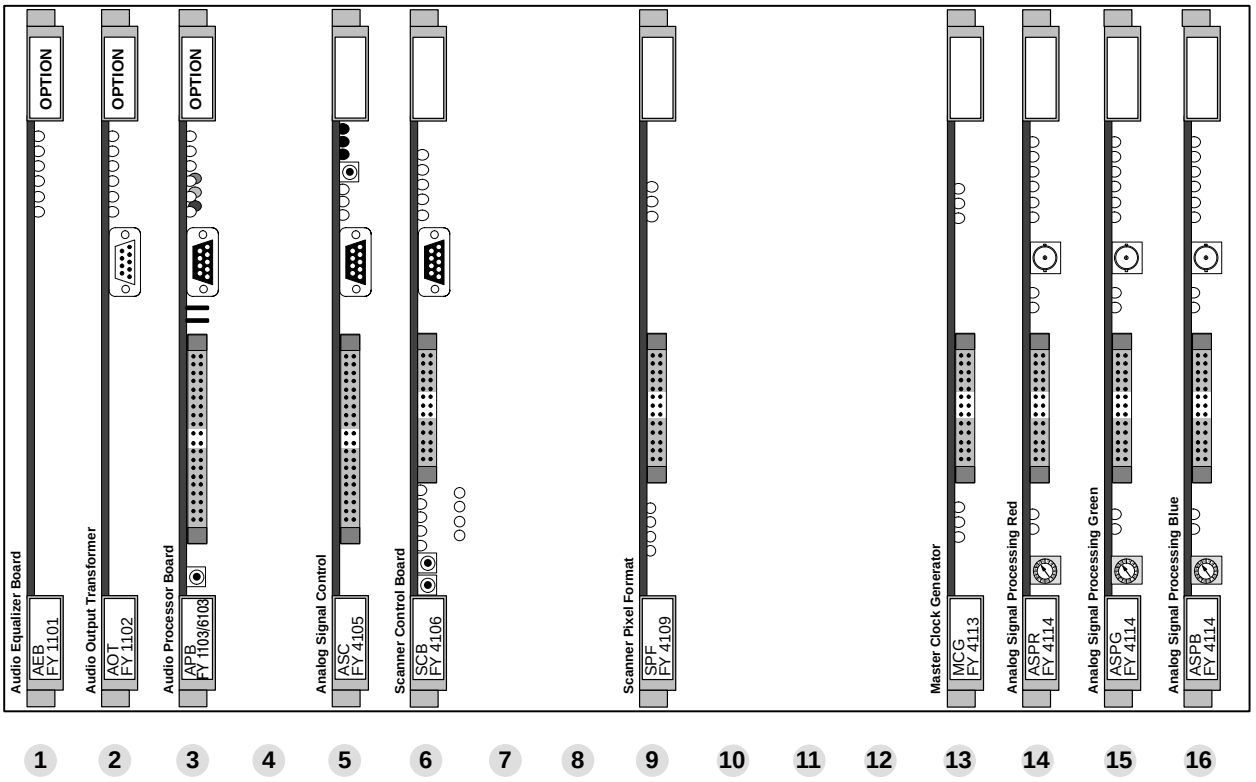


Fig. 601:Overview boards rack 1

1. FY 1101 Audio Equalizer
2. FY 1102 Audio Output
3. FY 1103 / FY 6103 Audio Processor
4. Reserve
5. FY 4105.xx Analog Signal Control
6. FY 4106.xx Scanner Control Board
7. Reserve
8. Reserve
9. FY 4109.xx Scanner Pixel Format
10. Reserve
11. Reserve
12. Reserve
13. FY 4113.xx Master Clock Generator
14. FY 4114.xx Analog Signal Processor RED
15. FY 4114.xx Analog Signal Processor GREEN
16. FY 4114.xx Analog Signal Processor BLUE

6.1.1 AUDIO EQUALIZER FY 1101 (OPTION)



1 - 4 + 6 LEDs (5x green): +12V; +8.25V; +5V; –5V; –12V

5 LED not in use

6.1.2 AUDIO OUTPUT FY 1102 (OPTION)

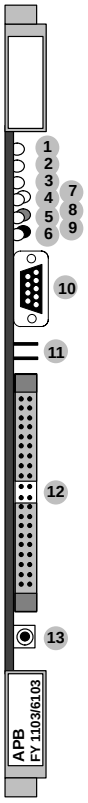


1 , 3 , 4 + 6 LEDs (4x green): +15V; +5V; –5V; –15V

2 + 5 LEDs not in use

7 Interface (9 pin, male): AES/EBU digital audio test input

6.1.3 AUDIO PROCESSOR FY 1103 / FY 6103 (OPTION)



1 , **3** , **4** + **6** LEDs (4x green): +12V; +5V; –5V; –12V

2 + **5** LEDs not in use

7 - **9** LEDs (green, yellow, red): processor control indicators
green: no errors (red: OFF)
yellow: monitor program started (service)
red: power up test error or online error (green: OFF)
green ON/red flashing: warnings
(level overflow, data transmission etc.)

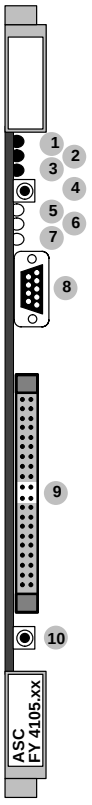
10 Interface (9 pin, female): RS232 interface for service terminal

11 Measuring points: M 14 / M 15, processor reset (shortcircuit)

12 Interface (40 pin, male): test point signals out

13 Service button: internal test tone gen. ON (1 kHz / 0 VU)

6.1.4 ANALOG SIGNAL CONTROL FY 4105



1 - **3** LED (red) ON: Stand by for rack 1, 2, 3

4 Button 1: reset for MCK (micro computer kernel)

5 - **7** LEDs (green) ON: VCC; M2V; VEE (+5V; –2V; –5V)

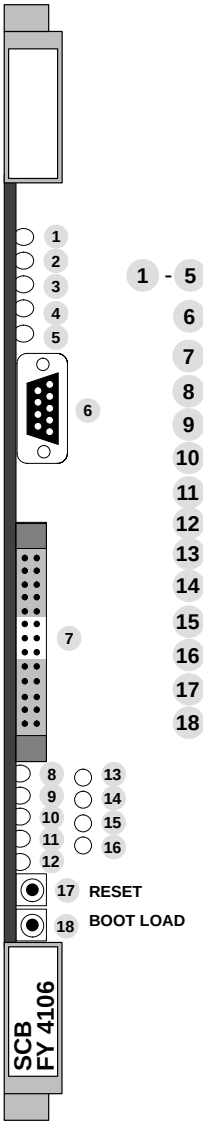
8 Interface (9 pin, female): RS232 interface for service terminal

9 Interface (40 pin, male): test point signal out

10 Button 2: test for MCK

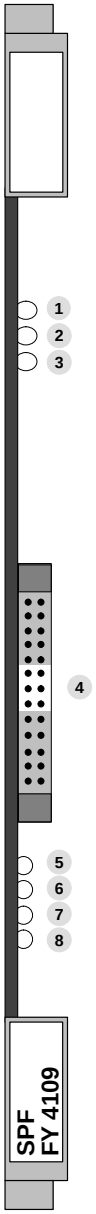
hold **button 2** and press **button 1**: starts MCK mon. progr. (service)

6.1.5 SCANNER CONTROL BOARD FY 4106



1 - 5 LEDs (5xgreen): +15V; –15V; +5V; –2V; –5V
6 Interface (9 pin, female): RS232 interface for service terminal
7 Interface (26 pin, male): Programmer interface
8 LCA READY LED green: LCA reset; red: LCA boot; off: LCA loaded
9 TEMP LED red: excess temperature of board
10 MOT ERR LED red: motor power amp over current
11 ERROR LED red: error of fan in scanner, proj.lamp, Rack 1 or cabinet top
12 FM CORR LED: not in use
13 GSD TARGET LED yellow: in target; off: during positioning
14 FW TARGET LED yellow: in target; off: during positioning
15 FM TARGET LED yellow: in target; off: during positioning
16 LAMP ERROR LED red: no projection lamp current
17 RESET button: reset DSP
18 BOOT LOAD switch (for internal use)

6.1.6 SCANNER PIXEL FORMAT FY 4109



1 - **3** LEDs (3xgreen): +5V; –2V; –5V

4 Interface (26 pin, male): Programmer interface

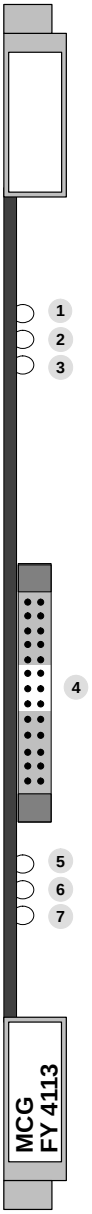
5 BOOT LED green: LCA reset; red: LCA boot; off: LCA loaded

6 TEMP LED red: excess temperature of board

7 GATES LED green: 1332 pixels / line;
red: Gate length not equal 1332 pixels per line

8 PULSES LED (SOL, SOF, SMI_REQ)
green: Reference pulses o.k.; red: one pulse is missing

6.1.7 MASTER CLOCK GENERATOR FY 4113



1 - **3** LEDs (3xgreen): +5V; –2V; –5V

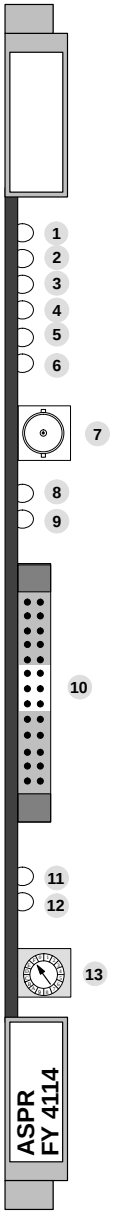
4 Interface (26 pin, male): Programmer interface

5 BOOT LED green: LCA reset; red: LCA boot; off: LCA loaded

6 TEMP LED red: excess temperature of board

7 TEST LED red: Test On; flashing red: No SOL

6.1.8 ANALOG SIGNAL PROCESSING BOARD FY 4114



1 - **6** LEDs (6xgreen): analog +12V; +5V; –5V; digital: +5V; –2V; –5V

7 Coaxial connector: CCD-Monitoring

8 CLP ERR ODD LED red: Clamp error odd; Monitoring Mode

9 CLP ERR EVEN LED red: Clamp error even; Monitoring Mode

10 Interface (26 pin, male): Programmer interface

11 BOOT LED green: LCA reset; red: LCA boot; off: LCA loaded

12 TEMP LED red: excess temperature of board

13 CODING switch: Monitoring Mode

6.2 RACK 2 FILM PROCESSING

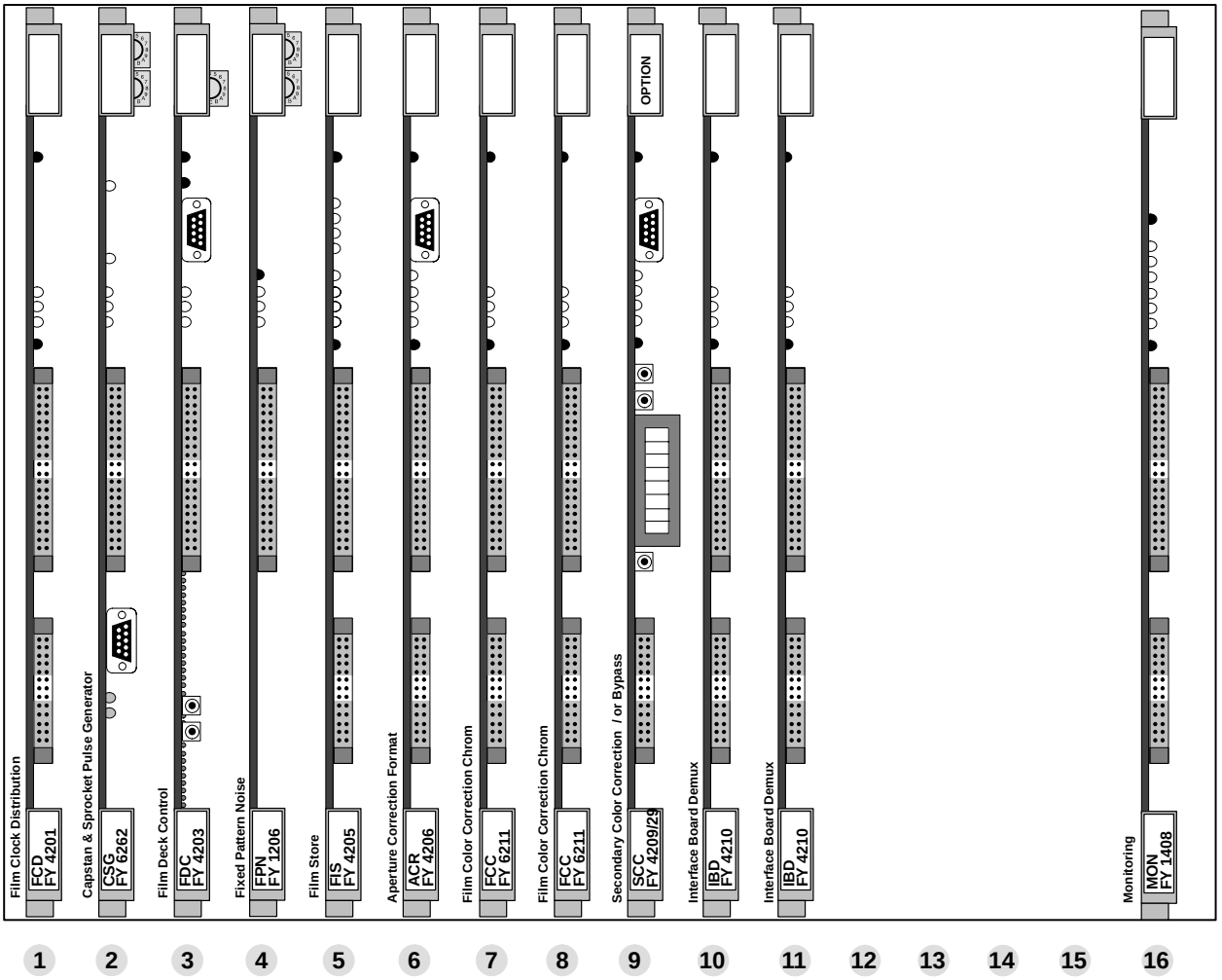
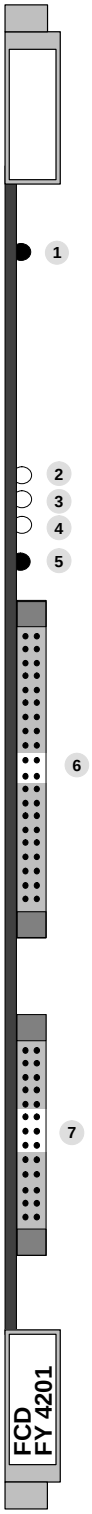


Fig. 602:Overview boards rack 2

1.	FY 4201.xx	Film Clock Distribution (FCD)
2.	FY 6262.xx	Capstan & Sprocket Pulse Generator (CSG)
3.	FY 4203.xx	Filmdeck Control (FDC)
4.	FY 1206	Fixed Pattern Noise lum/chrom (FPN)
5.	FY 4205.xx	Film Store (FIS)
6.	FY 4206.xx	Aperture Correctur Reformatting (ACR)
7.	FY 6211.xx	Film Color Correction Chrominance (FCC)
8.	FY 6211.xx	Film Color Correction Chrominance (FCC)
9.	FY 4209.xx	6 Section Color Correction (6SC Option)
	FY 4229	Bypass Secondary Color Correction
10.	FY 4210.xx	Interface Board Demux (IBD)
11.	FY 4210.xx	Interface Board Demux (IBD)
12.		Spare
13.		Spare
14.		Spare
15.		Spare
16.	FY 1408.xx	Monitoring (MON)

6.2.1 FILM CLOCK DISTRIBUTION FY 4201



1 LED (red): LCA configuration

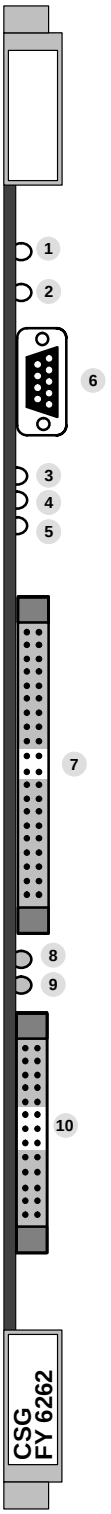
2 - **4** LEDs (3x green): VCC; M2V; VEE; (+5V; –2V; –5V)

5 LED (red): temperature warning (70°C) !

6 Interface (40 pin, male): test point signals out

7 Programmer Interface (26 pin, male)

6.2.2 CAPSTAN & SPROCKET PULSE GENERATOR FY 6262



1 - **5** LEDs (5x green): P12V; M12V; VCC; M2V; VEE
(+12V; –12V; +5V; –2V; –5V)

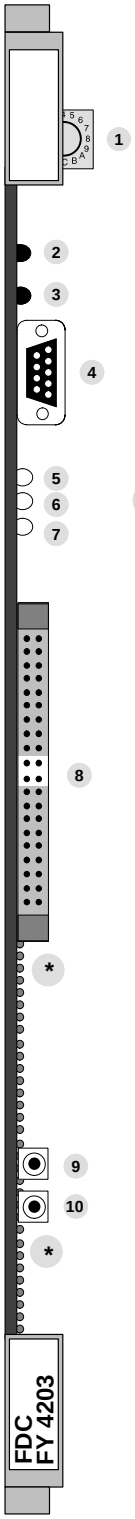
6 Interface (9 pin, female): RS232 interface for service terminal

7 Interface (40 pin, male): test point signals out

8 + **9** LEDs (2x yellow): 10 ON: capstan locked / 2V Film
11 ON: film deck ready; 2V Ref.
11 flashing: filmdeck error

10 Programmer Interface (26 pin, male)

6.2.3 FILMDECK CONTROL FY 4203



1 Hex. switch telecine no.: not used!

2 LED (red): LCA configuration

3 LED (red): Flash valid

4 Interface (9 pin, female): RS232 interface for service terminal

5 - **7** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

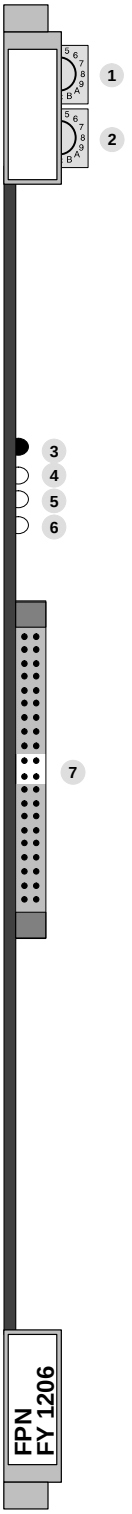
8 Interface (40 pin, male): test point signals out

9 Button 1: reset for MCK

10 Button 2: test for MCK (micro computer kernel)
hold **button 2** and press **button 1**: starts MCK mon. progr. (service)

***** **Note:**
Further LEDs on the p.c. board, see service manual.

6.2.4 FIXED PATTERN NOISE FY 1206



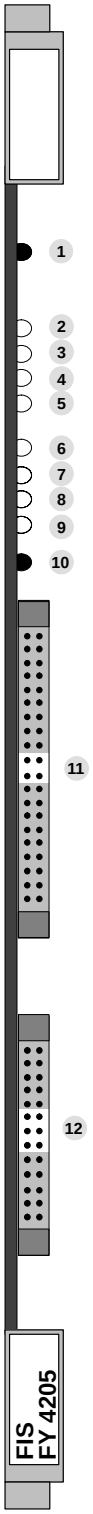
1 Hex. switch 1: LSB
2 Hex. switch 2: MSB
board version (for service use only)

3 LED (red): LCA configuration

4 - **6** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

7 Interface (40 pin, male): test point signals out

6.2.5 FILM STORE FY 4205



1 LED (red): LCA configuration

2 D / G2
LED (green) on: init. o.k. (RSCI)

3 C / G3
Flashing LED (green) shows frame bank change activity

4 B / G2
Flashing LED (green) shows red data LSB activity

5 A / G5
Flashing LED (green) shows blue data LSB activity

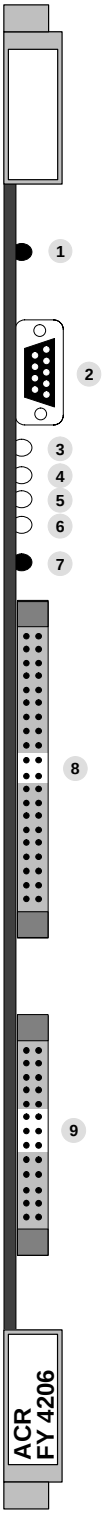
6 - **9** LEDs (4x green): P3V3;VCC; M2V; VEE; (+3,3V;+5V; –2V; –5V)

10 LED (red): temperature warning (70^{o}C) !

11 Interface (40 pin, male): test point signals out

12 Programmer Interface (26 pin, male)

6.2.6 APERTURE CORRECTION FORMAT FY 4206



1 LED (red): LCA configuration

2 Interface (9 pin, female): RS232 interface for service terminal

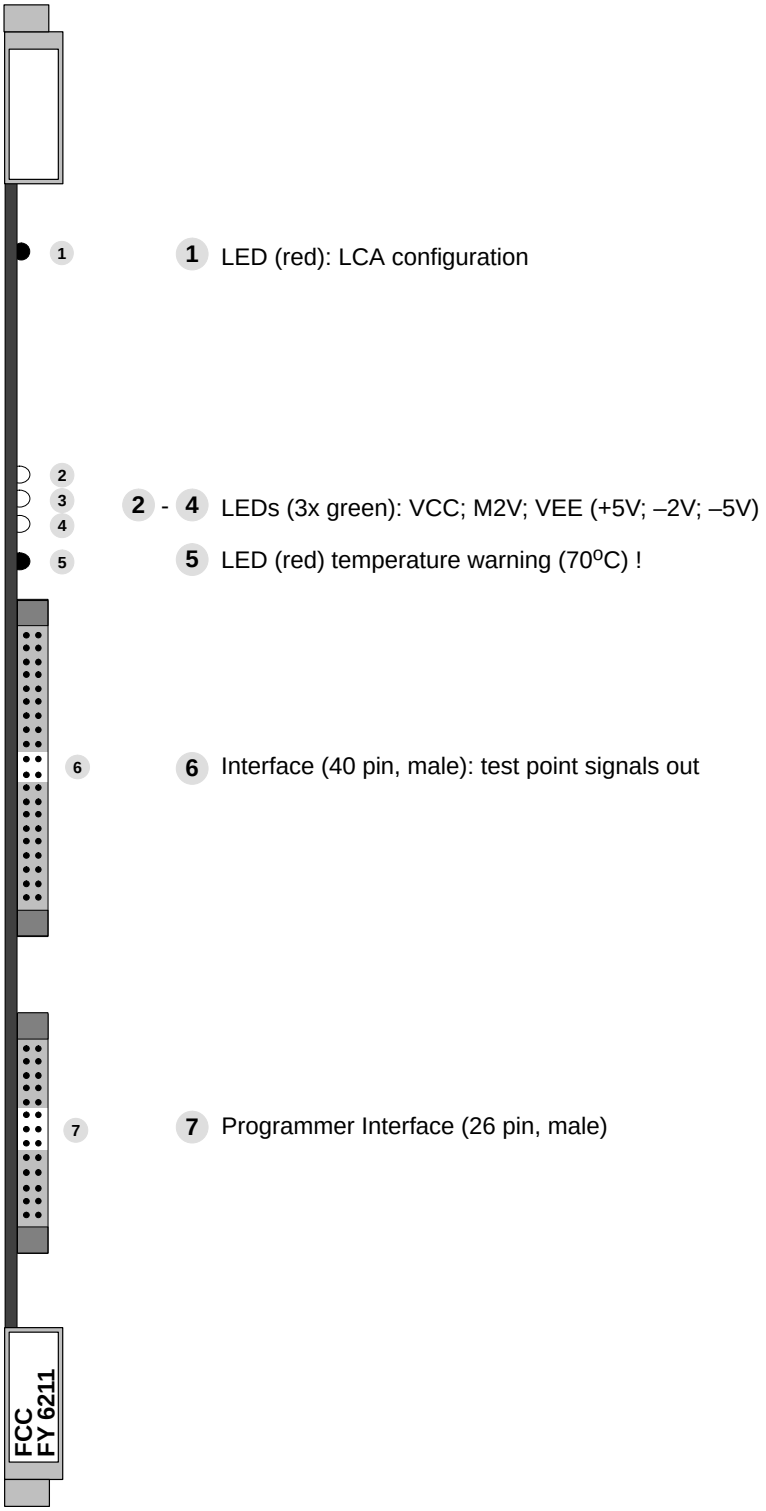
3 - **6** LEDs (4x green): P3V3;VCC; M2V; VEE; (+3,3V;+5V; –2V; –5V;)

7 LED (red) temperature warning (70^{o}C) !

8 Interface (40 pin, male): test point signals out

9 Programmer Interface (26 pin, male)

6.2.7 FILM COLOR CORRECTION CHROMINANCE FY 6211



1 LED (red): LCA configuration

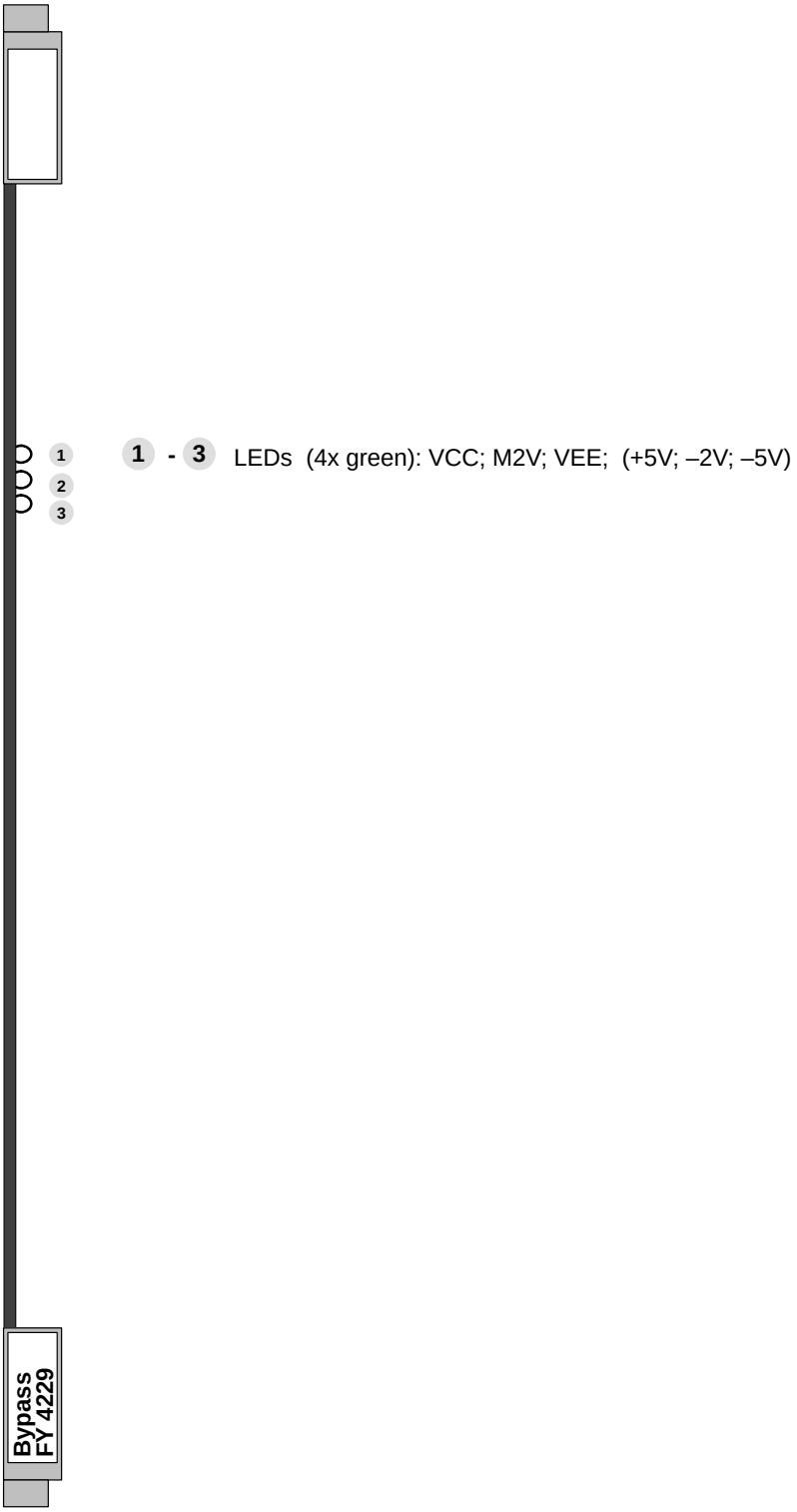
2 - **4** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

5 LED (red) temperature warning (70°C) !

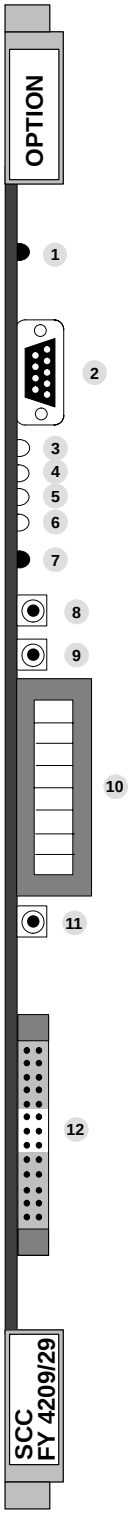
6 Interface (40 pin, male): test point signals out

7 Programmer Interface (26 pin, male)

6.2.8 BYPASS SECONDARY COLOR CORRECTION FY 4229



6.2.9 6 SECTOR COLOR CORRECTION FY 4209 (OPTION)



1 LED (red): LCA configuration

2 Interface (9 pin, female): RS232 interface for service terminal

3 - 6 LEDs (4x green): P3V3;VCC; M2V; VEE; (+3,3V;+5V; –2V; –5V;)

7 LED (red) temperature warning (70°C) !

8 Reset

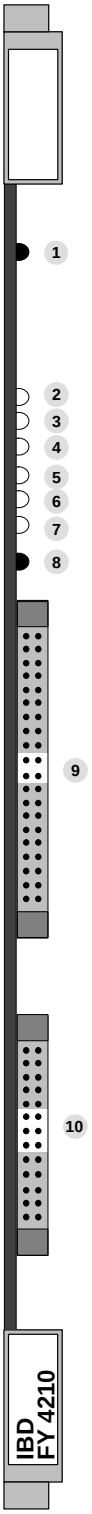
9 Select

10 Display: Status massages for service purpose

11 Enter

12 Programmer Interface (26 pin, male)

6.2.10 INTERFACE BOARD DEMUX FY 4210



1 LED (red): LCA configuration

2 LED (green) Internal Parity:
Error in signal processing

3 LED (green) TRS (IN-Signals):
Error in input signals

4 LED (green) Ref Pulses:
Error in reference pulses

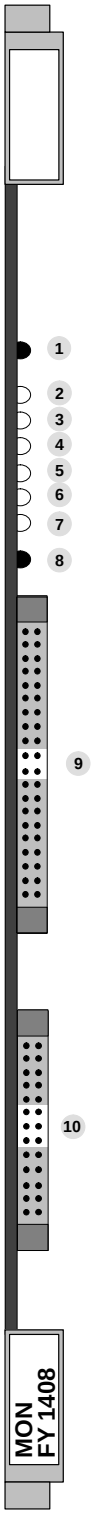
5 - **7** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

8 LED (red) temperature warning (70°C) !

9 Interface (40 pin, male): test point signals out

10 Programmer Interface (26 pin, male)

6.2.11 MONITORING FY 1408



1 LED (red): LCA configuration

2 - **7** LEDs (6x green): P5V; M5V; M12V; VCC; M2V; VEE (–5V; –5V; –12V; +5V; –2V; –5V)

8 LED (red) temperature warning (70°C) !

9 Interface (40 pin, male): test point signals out

10 Programmer Interface (26 pin, male)

6.3 RACK 3 FILM POSTPROCESSING

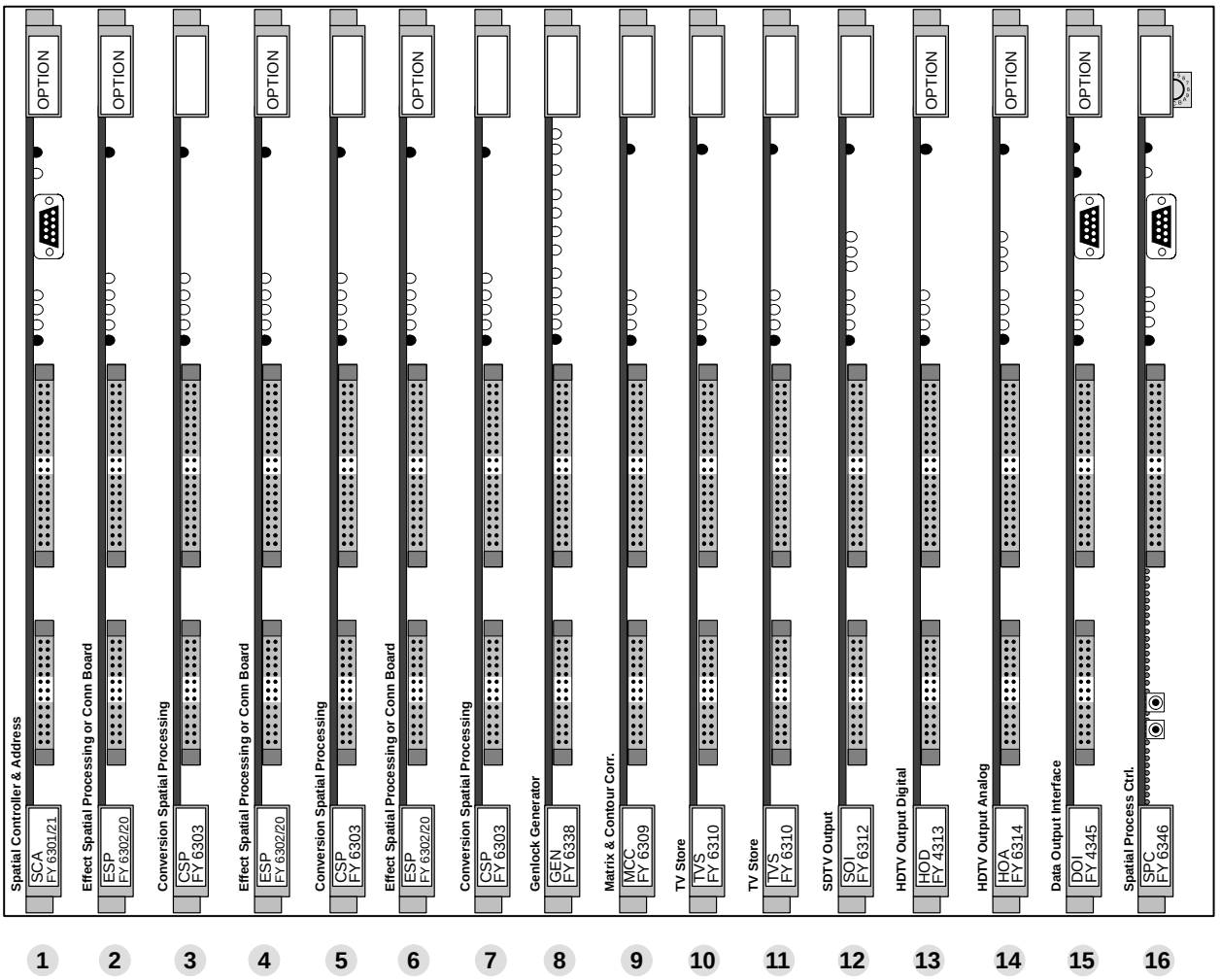
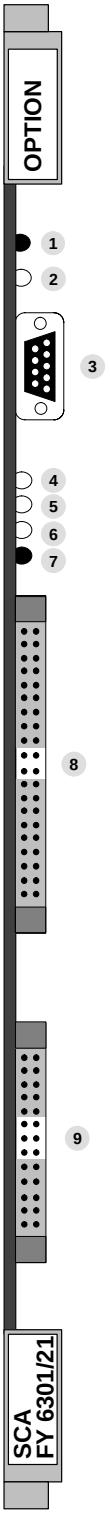


Fig. 603:Overview boards rack 3

1. FY 6301.xx/FY 6321.xx Spatial controller & Address with or w/o Rotation
2. FY 6302.xx/FM 6320 Effect Spatial Processing or Connection Board 3
3. FY 6303.xx Conversion Spatial Processing
4. FY 6302.xx/FM 6320 Effect Spatial Processing or Connection Board 3
5. FY 6303.xx Conversion Spatial Processing
6. FY 6302.xx/FM 6320 Effect Spatial Processing or Connection Board 3
7. FY 6303.xx Conversion Spatial Processing
8. FY 6338.xx Genlock Generator
9. FY 6309.xx Matrix & Contour Correction
10. FY 6310.xx TV Store
11. FY 6310.xx TV Store
12. FY 6312.xx SDTV Output
13. FY 4313 HDTV Output Digital
14. FY 6314.xx HDTV Output Analog
15. FY 4345.xx Data Output Interface
16. FY 6346.xx Spatial Processor Control

6.3.1 SPATIAL CONTROLLER & ADDRESS FY 6301 (w. Rotation)
SPATIAL CONTROLLER & ADDRESS FY 6321 (w.o. Rotation)



1 LED (red): LCA configuration

2 LED (green): Sync o.k.

3 9 pin female:Programmer Interface RS 232

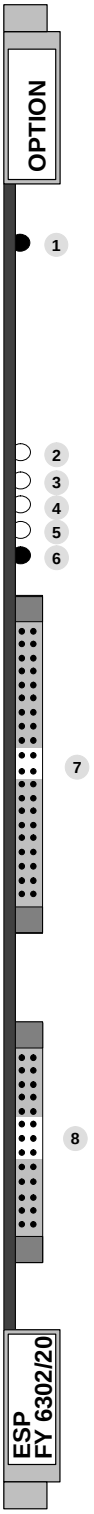
4 - **6** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

7 LED (red): temperature warning (70ºC) !

8 Interface (40 pin, male): test point signals out

9 Programmer Interface (26 pin, male)

6.3.2 EFFECT SPATIAL PROCESSING FY 6302 (w. Rotation) Alternatively Connection Board FY 6320 (w.o. Rotation)



1 LED (red): LCA configuration

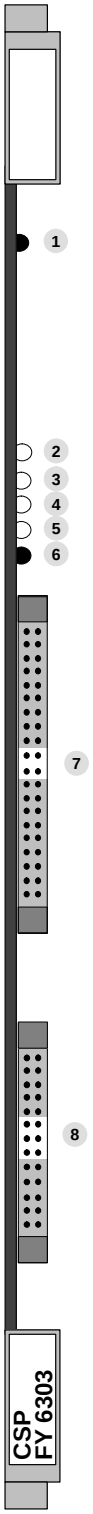
2 - **5** LEDs (4x green):P3V3; VCC; M2V; VEE (+3,3V;+5V; –2V; –5V)

6 LED (red) temperature warning (70ºC) !

7 Interface (40 pin, male): test point signals out (FY 6302)

8 Programmer Interface (26 pin, male) (FY 6302)

6.3.3 CONVERSION SPATIAL PROCESSING FY 6303



1 LED (red): LCA configuration

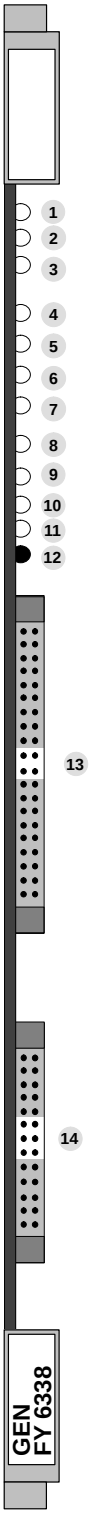
2 - **5** LEDs (4x green): P3V3; VCC; M2V; VEE (+3,3V;+5V; –2V; –5V)

6 LED (red) temperature warning (70ºC) !

7 Interface (40 pin, male): test point signals out

8 Programmer Interface (26 pin, male)

6.3.4 GENLOCK GENERATOR FY 6338



1 - **3** LEDs (3x yellow):

In case of internal Sync mode	In case of external Sync mode			
		G1	ON =	external Sync available
		G1	OFF =	no external Sync
OFF	ON	G2	ON =	Oscillator running
ON	ON	G2	OFF =	Error
OFF	ON	G3	ON =	Board locked to external Sync
		G3	OFF =	Board unlocked

4 - **7** LEDs (4x yellow):
TV standard (encoded, LED 4 = LSB / LED 7 =MSB)

LED 7 6 5 4					
0 0 0 0	=	1920 x 1080 L /	59.94i	or	1920 x 1080 L / 25.00 P
0 0 0 1	=	525 L /	59.94 i		
0 0 1 0	=	1250 L /	50.00 i	or	1920 x 1080 L / 50.00 i
0 0 1 1	=	625 L /	50.00 i		
0 1 0 0	=	1125 L /	60.00 i	or	1920 x 1080 L / 24.00 P
0 1 0 1	=	EDTV 625 L /	50.00 i		
0 1 1 0	=	1125 L /	59.94 i	or	1920 x 1080 L / 23.98 P
0 1 1 1	=	EDTV 525 L /	59.94 i		
1 0 0 0	=	1920 x 1080 L /	60.00 i	or	1920 x 1080 L / 24.00 sF
1 0 0 1	=	625 L 8:4:4 /	50.00 i		
1 0 1 0	=	DATA MODE		or	1920 x 1080 L / 23.98 sF
1 0 1 1	=	525 L 8:4:4 /	59.94 i		
1 1 0 0	=	1280 x 720 L /	60.00 p		
1 1 0 1	=	–			
1 1 1 0	=	1280 x 720 L /	59.94 p		
1 1 1 1	=	–			

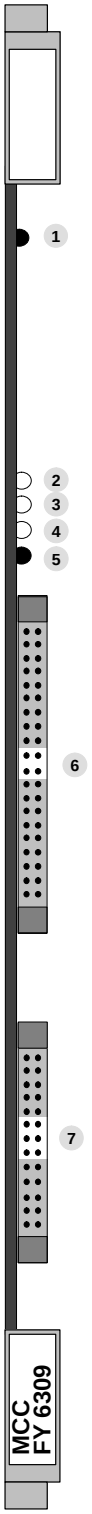
8 - **11** LEDs (4x green): P15V; VCC; M2V; VEE
(+15V; +5V; –2V; –5V)

12 LED (red) temperature warning (70°C) !

13 Interface (40 pin, male): test point signals out

14 Programmer Interface (26 pin, male)

6.3.5 MATRIX & CONTOUR CORRECTION FY 6309



1 LED (red): LCA configuration

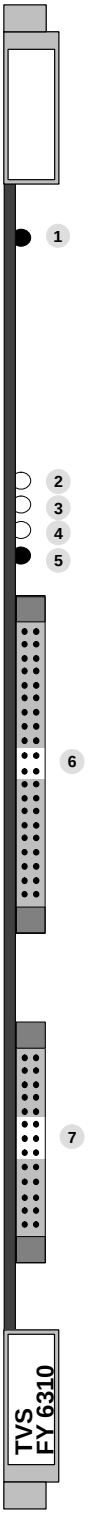
2 - **4** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

5 LED (red): temperature warning (70°C) !

6 Interface (40 pin, male): test point signals out

7 Programmer Interface (26 pin, male)

6.3.6 TV STORE FY 6310



1 LED (red): LCA configuration

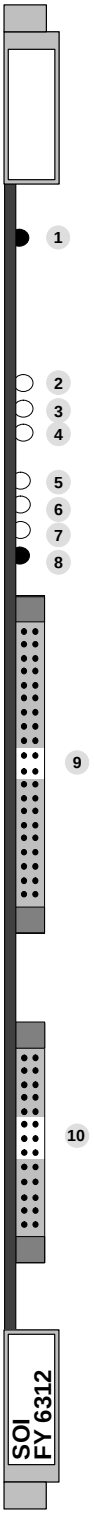
2 - **4** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

5 LED (red): temperature warning (70°C) !

6 Interface (40 pin, male): test point signals out

7 Programmer Interface (26 pin, male)

6.3.7 SDTV OUTPUT FY 6312



1 LED (red): LCA configuration

2 - **4** LEDs (3x green): Analog P5V; M5V; M12V (+5V; –5V; –12V)

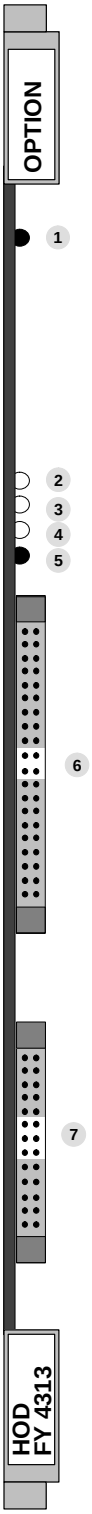
5 - **7** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

8 LED (red) temperature warning (70°C) !

9 Interface (40 pin, male): test point signals out

10 Programmer Interface (26 pin, male)

6.3.8 HDTV OUTPUT DIGITAL FY 4313 (OPTION)



1 LED (red): LCA configuration

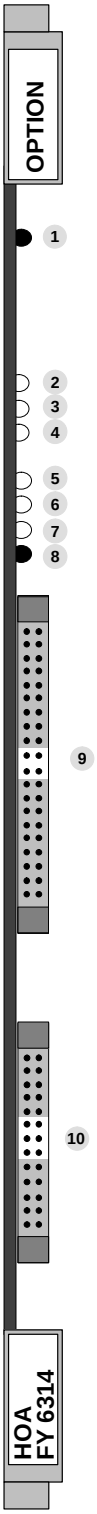
2 - **4** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

5 LED (red) temperature warning (70^{o}C) !

6 Interface (40 pin, male): test point signals out

7 Programmer Interface (26 pin, male)

6.3.9 HDTV OUTPUT ANALOG FY 6314 (OPTION)



1 LED (red): LCA configuration

2 - **4** LEDs (3x green): Analog P5V; M5V; M12V (+5V; –5V; –12V)

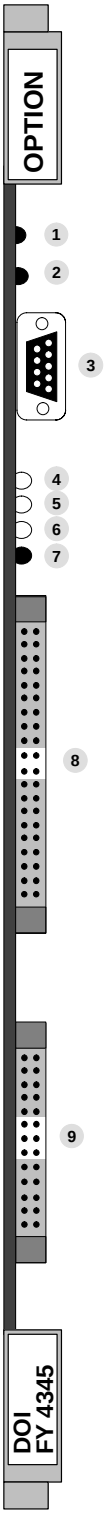
5 - **7** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

8 LED (red) temperature warning (70°C) !

9 Interface (40 pin, male): test point signals out

10 Programmer Interface (26 pin, male)

6.3.10 DATA OUTPUT INTERFACE FY 4345 (OPTION)



1 LED (red): LCA configuration

2 LED (red): Restart

3 9 pin female: Programmer Interface RS232

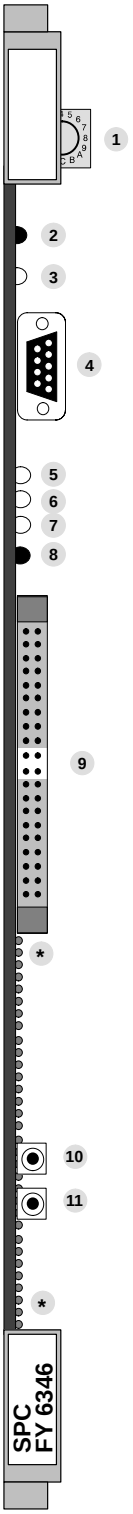
4 - **6** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

7 LED (red): temperature warning (70°C) !

8 Interface (40 pin, male): test point signals out

9 Programmer Interface (26 pin, male)

6.3.11 SPATIAL PROCESSOR CONTROL FY 6346



1 Hex-switch not used

2 LED (red): LCA configuration

3 LED (red): Flash valid

4 Interface (9 pin, female): RS232 interface for service terminal

5 - **7** LEDs (3x green): VCC; M2V; VEE (+5V; –2V; –5V)

8 LED (red): temperature warning (70°C) !

9 Interface (40 pin, male): test point signals out

10 Button 1: test for MCK (microcomputer kernel)

11 Button 2: reset for MCK

hold **button 2** and press **button 1**: starts MCK monitor program (service)

7. INTERFACES

Overview

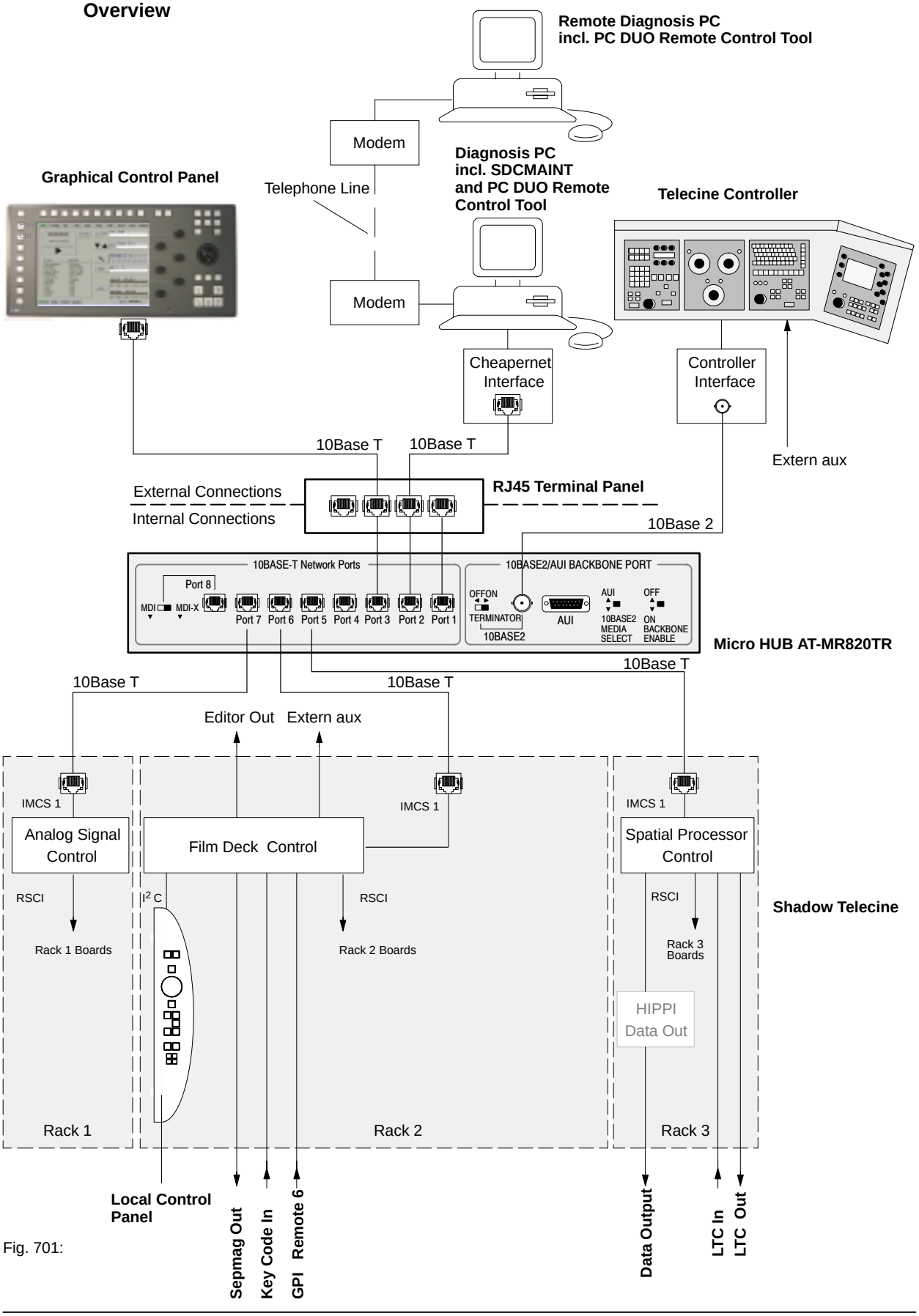


Fig. 701:

7.1 RJ45/IMCS (INTERNAL MACHINE COMMUNICATION SYSTEM)

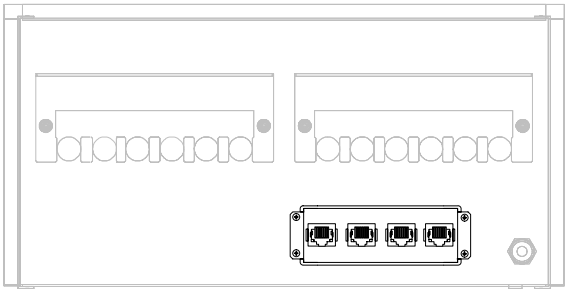


Fig. 702: RJ45/iMCS on Terminal Panel

Cheapernet system

The main components of the control system are connected via the serial IMCS bus system with each other (IMCS = internal machine communication system).

This bus is based on Ethernet standard IEEE 802.3.

The participants in the IMCS 1 system are:

Rack 1	Analog Signal Control
Rack 2	Film Deck Control Gateway Control (optional)
Rack 3	Spatial Processor Control

The Graphical Control Panel, various telecine controllers and a diagnostics PC can be accommodated within the IMCS net via RJ45 connectors on Terminal Panel.

ANSI standard

Standard	IEEE 802.3
Data rate	10 MBit/sec
Max. cable length	max. 100 m
Cable type	STP/UTP Category 3 or better
Connector	RJ45

7.2 REMOTE SYSTEMS / RJ45/iMCS

Remote Interfaces overview

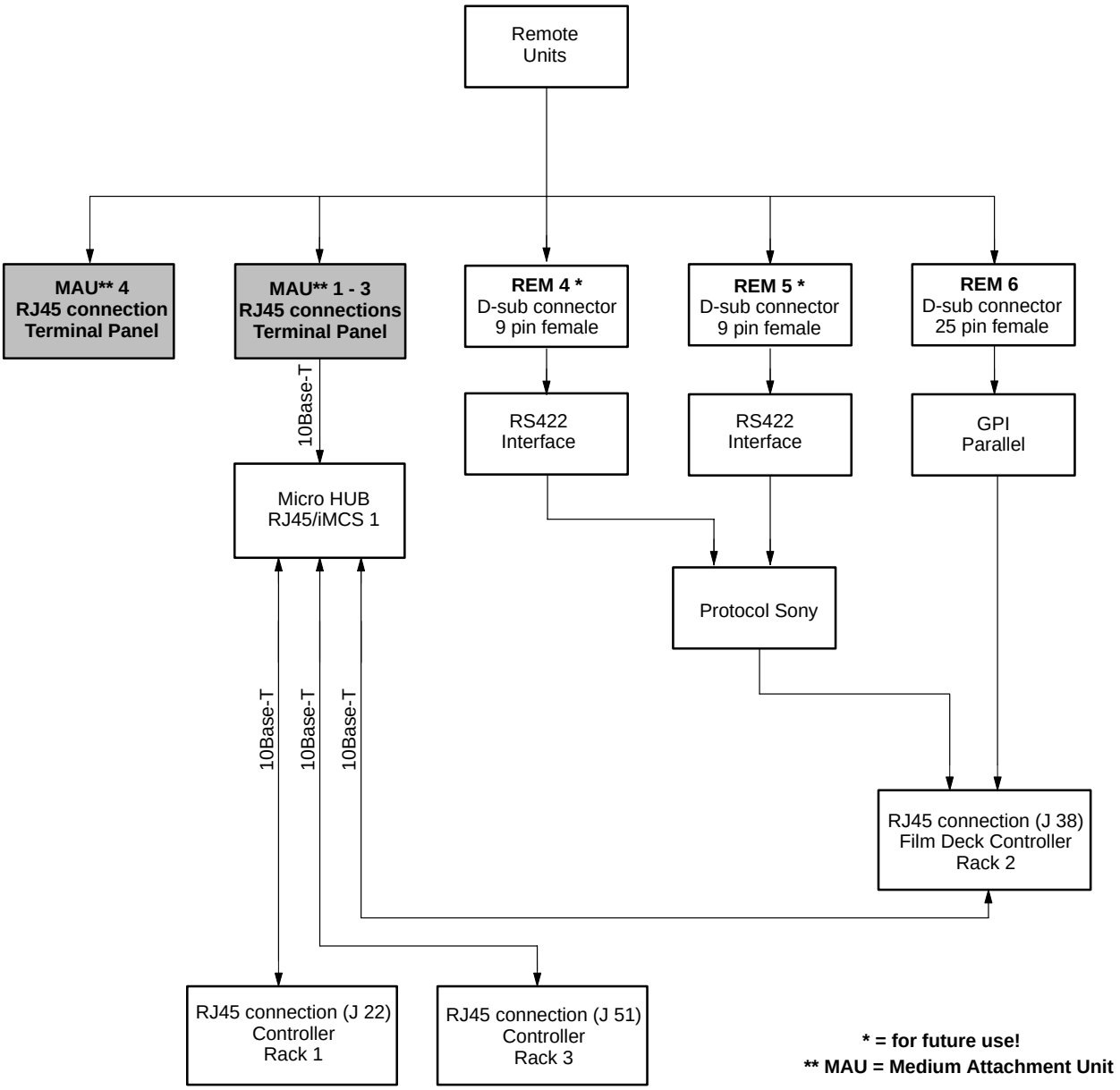
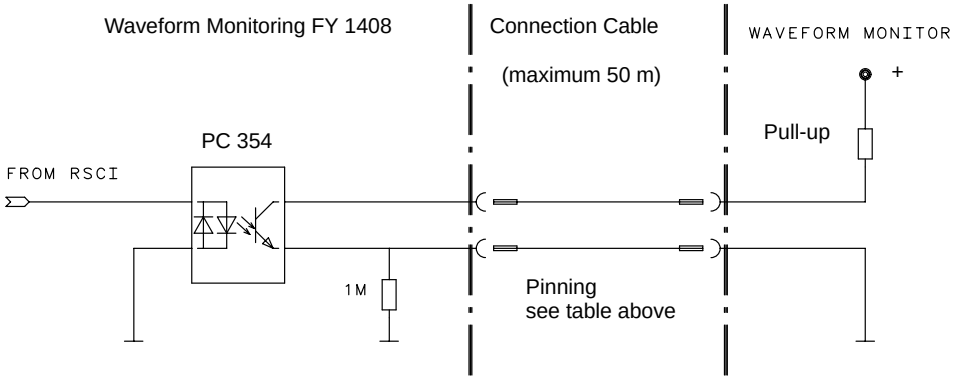


Fig. 703: Remote Systems RJ45/IMCS, RS 422 and GPI

7.3 REMOTE CONTROL OF WAVEFORM MONITORING J3,J4 / RACK 2

Output drivers: Opto Coupler PC 354
Open Collector
Control Outputs electrically insulated from the telecine
Pull–up resistors are in the particular Waveform Monitor
GND Pin 9 is connected via 1MΩ resistor to telecine ground



7.4 EXAMPLES FOR THE CONNECTION TO THE COLOR CORRECTOR

Diagram for the connection to a differential RS 422 receiver

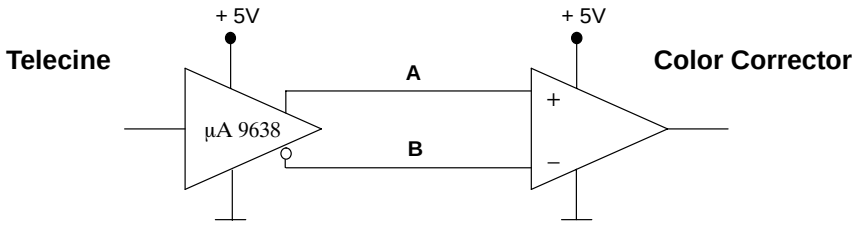
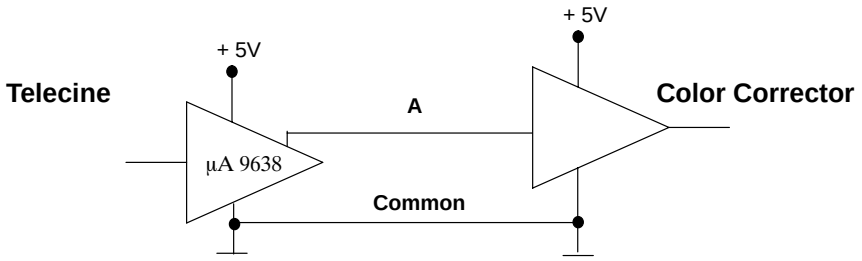


Diagram for the connection to a TTL receiver



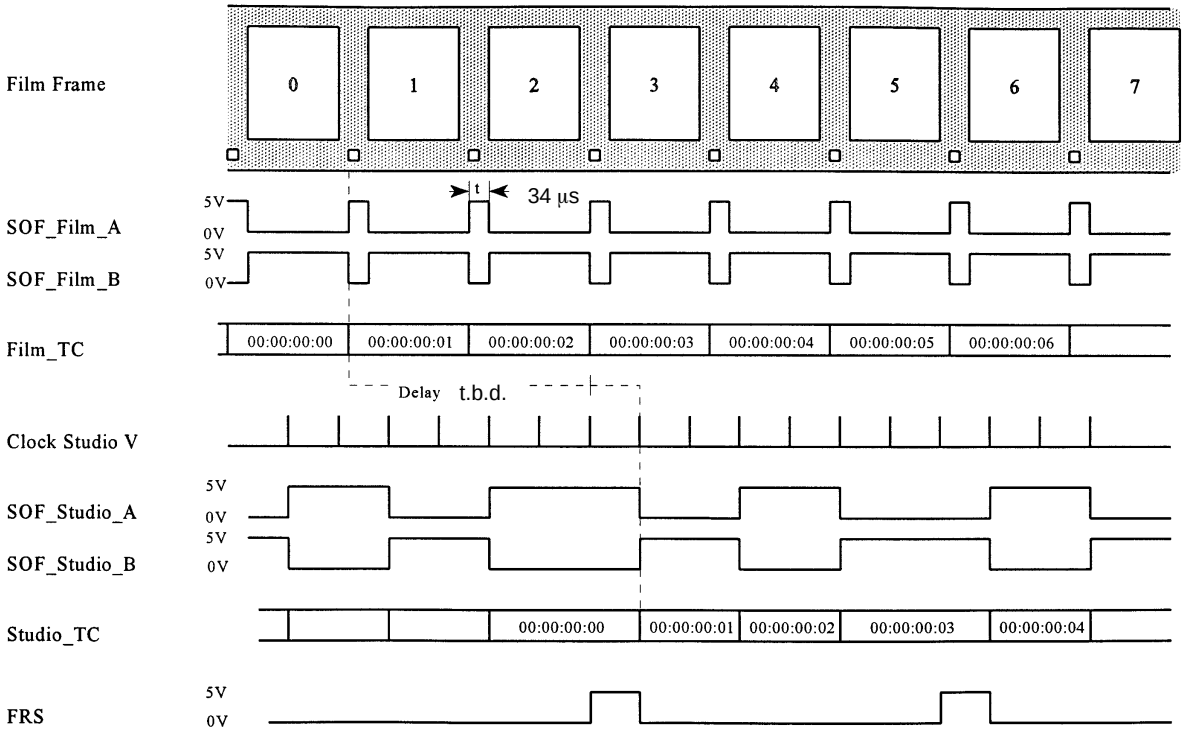


Fig. 704: Timing SOF_Film pulse:
t =**34** µsec in all modes

7.5 DESCRIPTION OF BI PHASE SIGNAL, SOF PULSE AND CFR OUT PULSE

BI Phase R & S Signal

configurable to 10x Bi Phase (250/240 Hz) or
2x Bi Phase (50/ 40 Hz) or
1x Bi Phase (25/ 24 Hz)

See Functional Control Panel FCP Chapter 4 Setup menu, Setup Genlock, Sep-mag coupling.

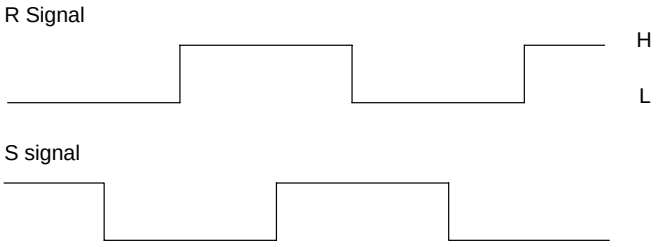


Fig. 705: BI Phase Signal

Output parameter:
transistor collector output with 1k ohm pull–up to +5V
U_{CE} = 40V max
I_C = 10mA max
U_{CEsat} = 0.2V

SOF Signal (Pulldown)

SOF (Start of frame) e. g. used for EVERTZ film footage encoder 4025.

TTL Output drive: 74 FCT 2244

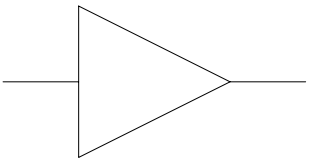


Fig. 706: SOF output driver

More details, see also figure 704 and figure 709

CFR Out Pulse Color Frame Reference

TTL Outputdrive: 74 FCT 244 ASO

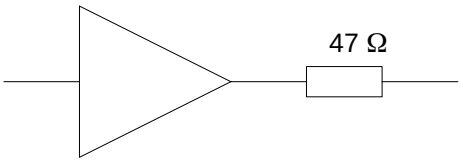


Fig. 707: CFR output driver

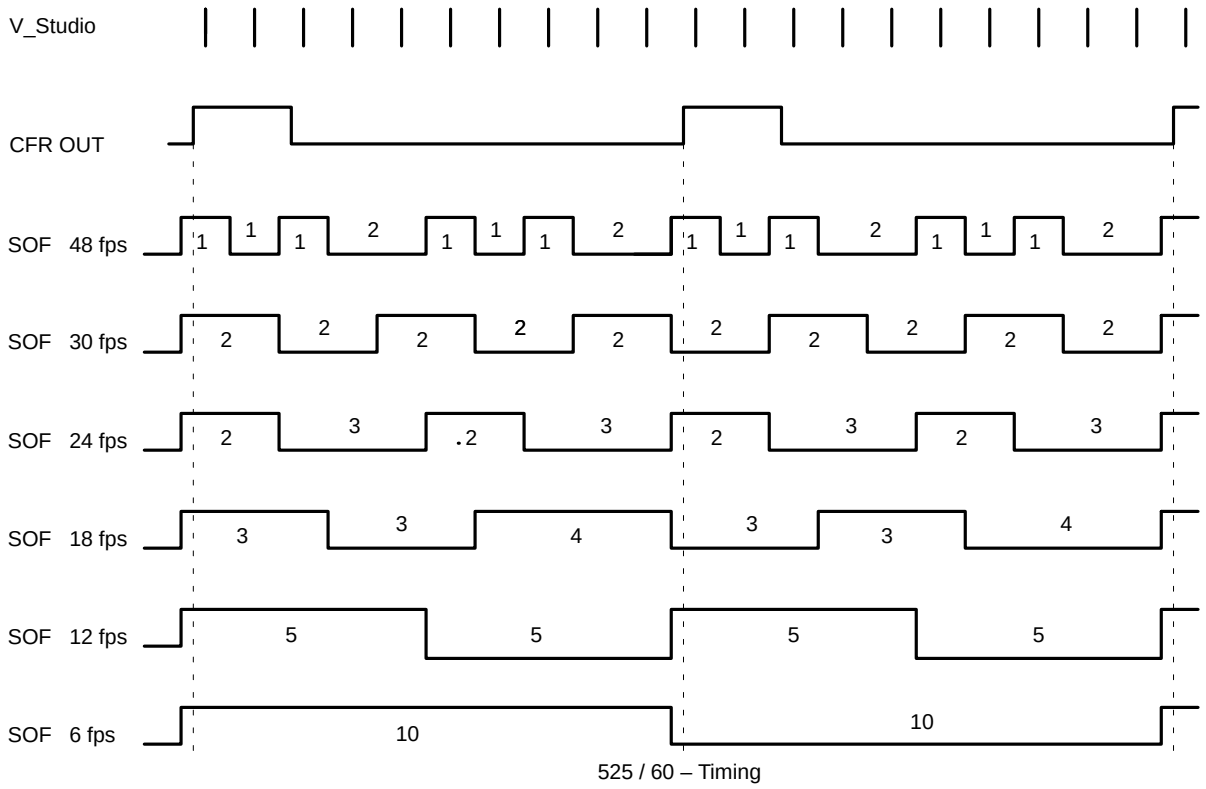


Fig. 708: Coarse Timing CFR OUT Pulse 525

Fixed speeds except SAS fit into 8V /50 Hz or 10V /60 Hz sequences. The figure 709 shows the pull down sequences for the 525 / 60 Hz and 625 / 50 Hz mode.

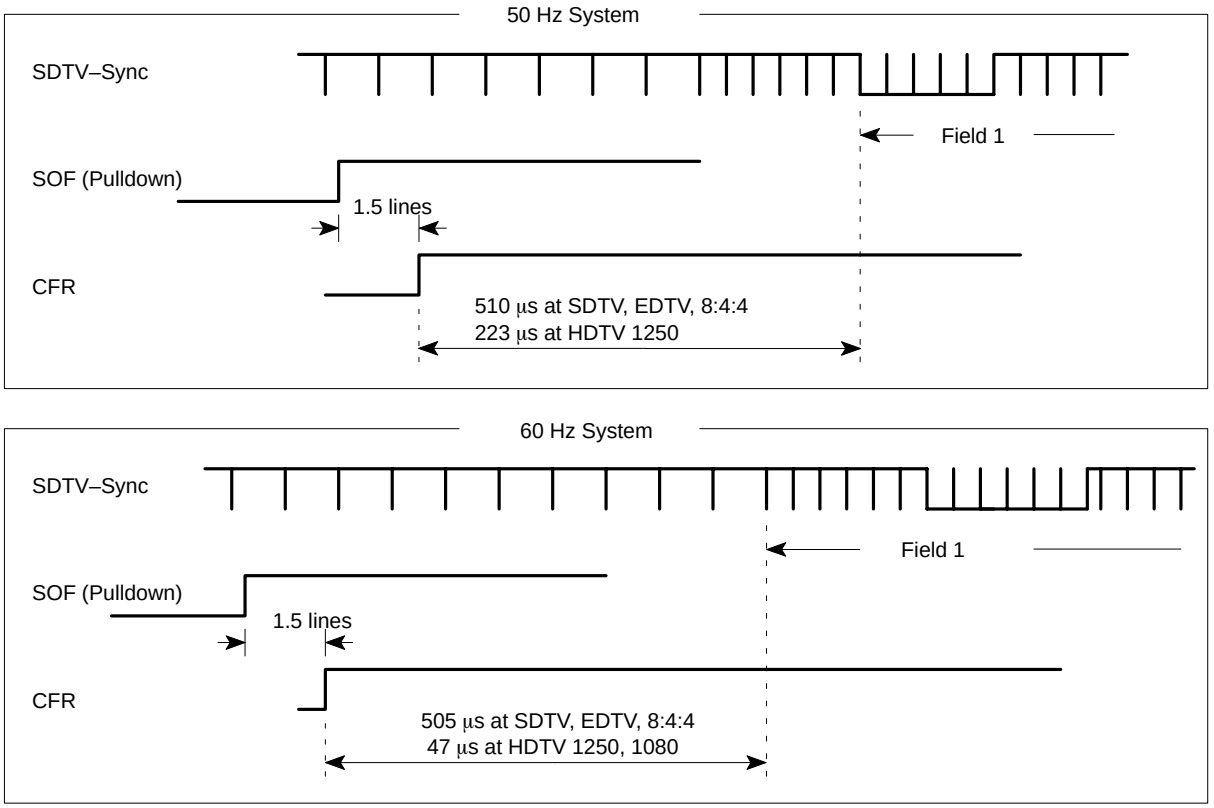


Fig. 709: Timing CFR OUT Pulse

7.6 DATA OUTPUT INTERFACE FY 4345

Overview

This chapter outlines the basic approach for data transfer between the Shadow Telecine and a computer system.

Data conversion modes

The following data conversion modes are supported:

1. ”TVLEV” Image data maintains the TV video levels:

black level	$64_{d\ (10\ bit)}$
white level	$940_{d\ (10\ bit)}$
within a total range of	$0 - 1023_{d\ (10\ bit)}$

2. ”GRLEV” Image data is mapped to graphic video levels

black level	0_{d}
white level	$1023_{d\ (10\ bit)}$
within a total range of	$0 - 1023_{d\ (10\ bit)}$

3. ”DXR” Printing density characteristic for CINEON DXR (Digital Extended Range) files - e. g. used for post production systems like Inferno / Fire (Discreet Logic) or Domino (Quantel) - which captures the dynamic range of NEG films.

4. ”TV_PD” Images, color graded on a TV monitor, are mapped to Printing Density characteristic for CINEON DXR files - e. g. used for post production systems like Inferno / Fire (Discreet Logic) or Domino (Quantel).

5. ”DXR-G” Printing density characteristic for CINEON DXR files, which captures the dynamic range of NEG films. In addition to the DXR mode, the DXR-G mode provides a closer color matching to the Kodak **Genesis** scanner.

6. ”TV-G” Images, color graded on a TV monitor, are mapped to Printing Density characteristic for CINEON DXR files. In addition to the TV_PD mode, the TV-G mode provides a closer color matching to the Kodak **Genesis** scanner.

7. “C-PD” Cineon Print Density
This logarithmic characteristic is close to the ideal Cineon print density characteristic. The density range is from 0 to 2.0. In addition to the TV_PD mode, the TV-G mode provides a closer color matching to the Kodak **Genesis** scanner.

Data Transfer via Shadow Telecine HIPPI Channel

In general the HIPPI channel will be treated like a video channel. It is assumed that the receiving device is able to cope with the amount of data. Therefore the operator has to select the film speed which is appropriate for the application.

The maximum data rate via the HIPPI channel will be 100 MB/s.

The lowest film speed for continuous film transport will be: 3 film frames / s

The resolution can be selected.

Horizontal = 256 ... 2048 pixel,

Vertical = 256 ... 1832 lines

The amount of data depends on film format.

- Data is RGB or Y only selectable
- Color sequence is R G B or B G R selectable.
- Special mode for key channel transfer.

Maximum pixel resolution is 10 bits. The scale can be logarithmic or linear (selectable).

General handling of Data

- For every film frame a HIPPI-FP packet is generated.
- HIPPI-FP packets consist of Header-Area and D2-Area. There is no D1-Area.
- The first 8K block within the D2-Area is reserved for file or image information.
- Image information always begins at the first 8K boundary of the D2 area (= DPX recommendation).

HIPPI I_Field 1 x 32 bit	HIPPI Header_Area = 2 x 32 bit	File header (DPX or TIFF) = 8192 Byte 0x0000....0x1FFF	Image-Data ..... 0x2000.....

- File information will correspond to SMPTE 268M DPX file format, see also notes on page 10-9. All core information will be provided.

Shadow Telecine Data Output

Parallel Interface Standard

The physical interface follows the HIPPI-PH standard (High-performance parallel interface, mechanical, electrical and signalling protocol specification *ANSI X3.183 - 1991, New York*).

Serial Interface Standard

The serial interface operates according to the HIPPI Serial Specifications *ANSI X3.300-1997*, using HIPPI-PH compatible signalling sequence and protocol (*ANSI X3.183-1991*).

The protocol of data transfer follows the HIPPI-FP standard (High-performance parallel interface, framing protocol *ANSI X3.210-1992*).

Data Format

The interface is 32 bits wide. Organization is shown in figure 710. Normally a HIPPI-FP packet consists of three areas: header_, D1_ and D2_Area. In general the D1_Area is needed to exchange control information via the HIPPI channel. In the telecine the data output is controlled over a separate interface according to the Ethernet standard with an IP/UDP protocol so that the D1_Area is dropped.

In the HIPPI-FP packet, the byte order is opposite to the bit-significance of the 32bit-word, i.e. byte 0 is located in the bits 24...31 and byte 3 in the bits 0...7. Independent from this order the byte order of the image data in the D2_Area is determined by a switch in the header area of the image data (magic number in DPX files).

The following explanations refer to the items in the packet format (figure 710).

- **ULP-id:** bit 24...31, id for Upper Layer Protocol, this information can be configured via the control system : default = 10000000; (1xxxxxxx = locally assigned)
- **P:** bit 23, D1_Data_Set_Present, set to 0.
- **B:** bit 22, Start_D2_on_Burst_Boundary, set to 0 (D2_Area may start at or before beginning of second burst of the packet, burst = 256 words = 1kbyte).
- **D1_Area_Size:** bit 3...10, no D1_Area present, set to 0.
- **D2_Offset:** bit 0...2, no offset, data-set begins at start of D2_Area, set to 0.
- **D2_Size:** 32 bits, length in bytes of the data in D2_Area except of fill-bytes at the end (0 D2_Size 4GBytes-2).
- **D2_Area:** starts and ends on an 64-bit boundary, filled at the end in case of need.

Contents of I-field

- **For Data Output FY 4345.11 and higher**

BYTE 0	BYTE 1	BYTE 2	BYTE 3
0x03	0x00	0x00	variable*

* = set via Graphical Control Panel; menu TK Config - submenu Data - Destination

Note:

1. destination routing
2. camp on
3. dest = 1
4. src = 0

	BYTE 0	BYTE 1	BYTE 2	BYTE 3
bit	31	23	15	7
Header_	**ULP-id**	P B **Reserved**	**D1_Area_Size**	D2_ Offset
Area	**D2_Size**			
Area D2_Area	**D2_Data_Set**			

Fig. 710: **HIPPI-FP packet format**

HIPPI Connection Model

Datagram Mode and Stream Mode are supported. This mode can be selected via the control system (GCP - TK Config menu - submenu Data - connection mode).

Details of Stream Mode:

Single connection, multiple packets.
The telecine sets up a single connection and sends multiple PACKETS on that connection (REQUEST/CONNECT)

Details of the Datagram Mode:

Single Connection, single Packet.

Telecine sets up a single connection (REQUEST/CONNECT) and sends one PACKET on that connection.

After the transmission of the packet the connection is released. (REQUEST/CONNECT/DISCONNECT)

One PACKET is always one film-frame.
One standard burst consists of 256 * 32 bit data. The single allowed *"Shortburst"* will always be the last burst of a packet.

Image data format

The image data is always placed in the D2_ Data_ Set.

Address 0 - 1FFFH reserved for DPX or TIFF header.
Address 2000H ... : start of image data.

For the transfer of digital component data into the 32-bit-HIPPI-channel six selectable modes are provided, illustrated in chapter 7.6.1.

Selectable Modes 1 - 6

1. 3*8 bit + key - channel

2. 3*10 bit

3. 3*10 bit + key-channel expanded to 4*16 bit (1pixel in 2 HIPPI-Words)

4. 3*10 bit Y - only (3 pixel per HIPPI-Word)

5. 2 *10 bit expanded to 2 * 16 bit (Lum only) (2 pixel in 1 HIPPI-Word)

6. 3 * 10 bit key-channel (3 pixel per HIPPI-Word)

Image DPX Data Format

The relevant information of the embedded keycode are described in the fields 43 - 48 and 76.16 - 76.21.
The standardized format is shown in the following tables.

DPX - SMPTE 268M header information					
Field	**Offset**	**Length**	**Type**	**Name**	**Content**
1	0	4	U32	magic number	0x53445058 (ASCII-code of ″SDPX″)
2	4	4	U32	offset to image data	0x00002000 (8k) bytes
3	8	8	ASCII	version number of header format	V1.0
4	16	4	U32	total image file size in bytes	size of(element_1) + 0x2000 /*header*/
6	24	4	U32	generic sect. length	1664 as default
7	28	4	U32	industry sect. length	384 as default
8	32	4	U32	user-def. sect. length	6144 as default
15	660	4	U32	Encryption key	0xFFFFFFFF
17	768	2	U16	image orientation	0 as default
18	770	2	U16	no. of image elements	always 1
19	772	4	U32	pixels per line	x-value of reproduction format
20	776	4	U32	lines per image	y-value of reproduction format
21	780	**image element 1**			
21.1	780	4	U32	data sign	0 (unsigned)
21.2	784	4	U32	reference low	8bit = 0 10bit = 0 16bit = 0 as default
21.3	788	4	R32	reference low quantity	0 as default (float)
21.4	792	4	U32	reference high	8bit = 255 10bit = 1023 16bit = 65535
21.5	796	4	R32	reference high quantity	2.047 as default (float)
21.6	800	1	U8	descriptor	4 = (Key-only) 6 = (Y-Only) 50 = (R,G,B) 51 = (R,G,B,key) 151 = (B,G,R) 152 = (B,G,R,key)
21.7	801	1	U8	transfer characteristic	0 = user defined 1 = printing dens or 2 = linear 3 log
21.8	802	1	U8	colorimetric spec.	0 = user defined or 1 = printing dens or 2 = not applicable
21.9	803	1	U8	bit size	mode 1: 8 mode 2, 4, 6: 10 mode 3, 5: 16

DPX User defined data					
Field	**Offset**	**Length**	**Type**	**Name**	**Content**
21.10	804	2	U16	packing	mode 1, 3, 5: 0 (packed into 32bit words) mode 2, 4, 6: 1 (filled into 32bit words) ***--- notes ---*** *1-HIPPI-Word sequence in 8 bit mode* *31...24: R* *23...16: G* *15...08: B* *07...00: key* *2-HIPPI-Word sequence in 16 bit mode* *word n:* *31...16: R* *15...00: G* *word n+1* *31...16: B* *15...00: key* *the SMPTE DPX header uses for the 3*10bit mode a "right justified" notation of the 30bits. In order to be compatible with Kodak CINEON images the notation "left justified" is used for RGB images instead* *bits:* *31..22 : R* *21..12 : G* *11..02 : B* *01..00 : spare* *Y-only images are according to DPX !!!* 31...30 : spare 29...20 : Yn+3 19...10 : Yn+2 09...00 : Yn+1
21.11	806	2	U16	encoding	0
21.12	808	4	U32	offset to data	0x00002000
21.15	812	4	U32	end of line padding	0 by default
21.15	816	4	U32	end of image padding	0 by default
21.15	820	32	ASCII	description	
gap					
41	1628	8	2*U32	pixel aspect	Horizontal: vertical
gap					
43	1664	2	ASCII	Film manufacturer ID	2 digits of film edge code
44	1666	2	ASCII	Film type ID	2 digits of film edge code
45	1668	2	ASCII	Frame offset	2 digits of film edge code
47	1670	6	ASCII	Prefix (film reel ID)	2 digits of film edge code
48	1676	4	ASCII	Count (film length i. feet)	2 digits of film edge code
gap					
50	1712	4	U32	position in sequence	actual filmtimer value
gap					
58	1920	4	U32	SMPTE timecode	film keycode in case
59	1924	4	U32	SMPTE user bits	film keycode in case
61	1929	1	U8	field number	
gap					

DPX User defined data					
Field	**Offset**	**Length**	**Type**	**Name**	**Content**
75	2048	32	ASCII	User identification	”Thomson – SHADOW TELECINE”
76.1	2080	4	ASCII	User Magic Number	”PDPX” identifies that this is a valid UD–header
76.2	2084	1	U8	Board Type	Thomson internal Data 00 = FY6315 01 = FY4345
76.3	2085	1	U8	FirmwareVersion ID	Thomson internal Data Same Number as on control panel
76.4	2086	1	U8	Protocol Version ID for user defined header area	Thomson internal Data
76.5	2087	1	U8	Future Use Tbd	Thomson internal Data
76.6	2084	4	U32	Shadow Status	Bit 0..1 00 = don’t care 01 = output mode transfer 02 = output mode display 03 = output mode continues Bit 15...2 undocumented
76.7	2088	1	U8	Data–Board Transfer Function	Thomson internal Data 00h = standard log 01h = linear 02h = TV–Log 03h = DXR–Log 04h = future use 05h = future use 06h = future use 07h = future use
76.8	2093	1	U8	Shadow Transfer Function	Thomson internal Data Bit 0: CRT–GAMMA 0 = OFF 1 = ON
76.9	2090	1	U8	Primary Modes (Color Correction)	Thomson internal Data Bit 2..0: primary mode 00: print positive 01: intermediate positive 02: print negative 03: color negative 04: primetime negative 05: primetime positive 06: intermediate negative 07: color positive
76.10	2095	1	U8	Tbd	Tbd
76.11	2096	2	U16	Linear low reference value	Thomson internal Data 0: for Video Levels 64: for Graphic Levels
76.12	2098	2	U16	Linear high reference value	Thomson internal Data 940: for Video Levels 1023: for Graphic Levels
76.13	2100	2	U16	Steadiness X–Vector	Thomson internal Data Default = 0x8000 (1 unit = 1/100µm)
76.14	2102	2	U16	Steadiness Y–Vector	Thomson internal Data Default = 0x8000 (1 unit = 1/100µm)
76.15	2104	1	U8	Optic Type	Thomson internal Data 00: 01: 02: 03:

DPX User defined data					
Field	**Offset**	**Length**	**Type**	**Name**	**Content**
76.16	2105	1	U8	Future Use Tbd	Thomson internal Data
76.17	2106	2	U16	Future Use Steadiness Rotation Angle	Thomson internal Data Rotation angle (0x8000 = 0°) 0..360° = 0x0000...0xffff
76.18	2108	2	U16	H–Scanning area	Thomson internal Data 1 unit = 1µm
76.19	2110	2	U16	V–Scanning area	Thomson internal Data 1unit = 1µm
76.20	2112	2	U16	Center Position X	Thomson internal Data 1unit = 1µm
76.21	2114	2	U16	Center Position Y	Thomson internal Data 1unit = 1µm
76.22	..	..	..	Future Use TBD	
76.xx	2559	1	U8	Future Use TBD	Last element of SHADOW generated User Data

TIFF (Tag Image File Format)[1]

The second image file header format provided by Shadow Telecine is TIFF, mostly used in consumer applications. The maximal length is 4 GBytes. A TIFF file begins with an 8-byte image file header that points to an image file directory (IFD) containing information about the image and pointers to the image data.

This TIFF header implementation is based on :

TIFF Revision 6.0

Final - June3,1992

The TIFF header can only be used together with the

- 4 * 8 bit RGB+key mode
- 4 * 16 bit RGB+key mode

All other modes are not supported by the current implementation of most readers and not noted in any standard release.

The following drawing shows the TIFF structure.

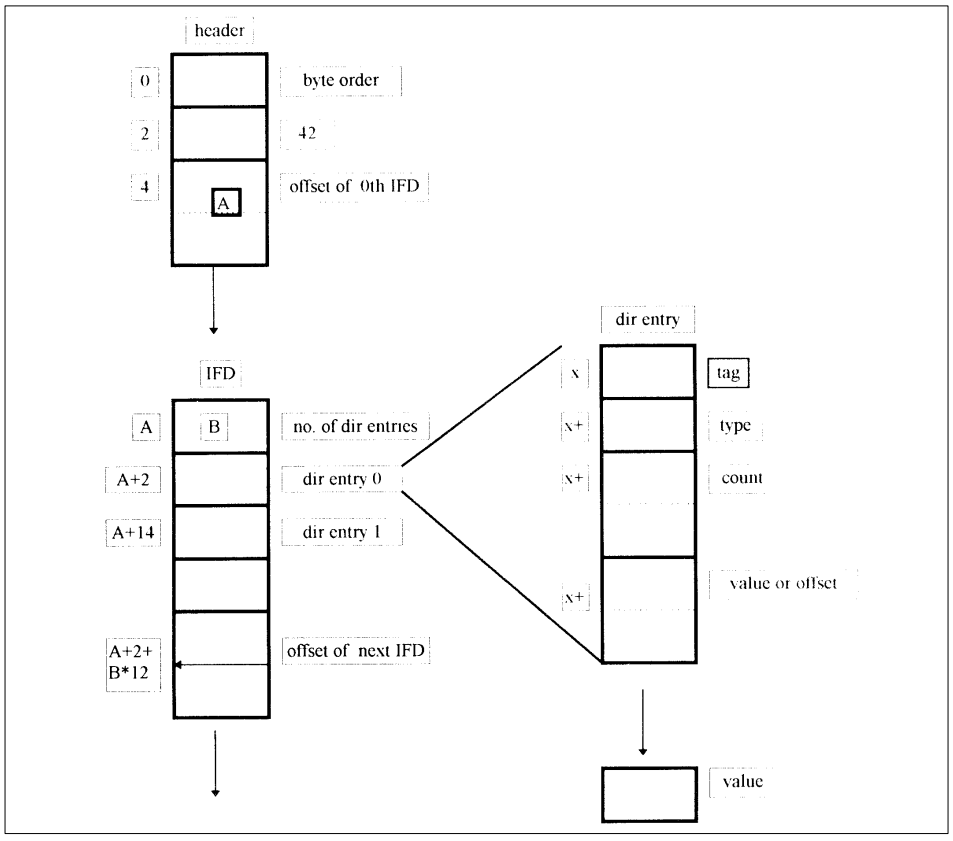


Fig. 711:

1. *TIFF Revision 6.0, June 3, 1992, Aldus co., Seattle*

TIFF image file header		
Bytes	**Name**	**Content**
0,1	byte order	″MM″ (0x4d4d), big-endian
2,3	TIFF ID	42
4...7	offset in bytes of first IFD	= 10
8...9	gap	random number
10...11	number of tags	= 15
12.....	start of IFDs	see IFDs

TIFF image file directory (IFD)		
Bytes	**Name**	**Content**
0,1	Tag (field id)	16-bit number
2,3	field type	1 = BYTE 2 = ASCII 3 = SHORT 4 = LONG 5 = RATIONAL
4...7	Count	no. of values of indicated type
8...11	Value/Offset	value if <= 4bytes otherwise file offset (in bytes) to value

The following table shows the required fields for R,G,B,Alpha full color images. Shadow doesn't provide breaking an image into several strips, so the number of StripOffsets (tags 273) and StripByteCounts (tag 279) is one and RowsPerStrip (tag 278) corresponds to ImageLength.

IFD of RGB full color image				
Tag	**Name**	**Type**	**Count**	**Value(s)**
255	New SubfileType	LONG	1	1
256	ImageWidth	SHORT/LONG	1	no. of pixels per scanline
257	ImageLength	SHORT/LONG	1	no. of scanlines
258	BitsPerSample	SHORT	SamplesPerPixel	8/16
259	Compression	SHORT	1	1 (no)
262	Photometric Interpretation	SHORT	1	2 (=RGB)
256	Fill Order	SHORT/LONG	1	no. of pixels per scanline
273	StripOffsets	SHORT/LONG	1	byte offset of image data from beginning of file
277	SamplesPerPixel	SHORT	1	4 (R,G,B,key)
278	RowsPerStrip	SHORT/LONG	1	ImageLength
279	StripByteCounts	SHORT/LONG	1	ImageWidth*ImageLength* SamplesPerPixel* (BitsPerSample/2)
282	XResolution	RATIONAL	1	235,176 = random no. of pixels per resolution unit horizontal
283	YResolution	RATIONAL	1	235,176 = random no. of pixels per resolution unit vertical

IFD of RGB full color image				
Tag	**Name**	**Type**	**Count**	**Value(s)**
296	ResolutionUnit	SHORT	1	2 (= no absolute measurement)
296	Extra Samples	SHORT	1	2 (= Unassociated ALPHA Data)

Note: Not all TIFF readers can read R, G, B, Alpha images.

The following software packages can read Shadow TIFF files:

- **imgview** of SGI - IRIX 6.2 can read 4*8 bit R, G ,B, Alpha and 4*16 bit R, G, B, Alpha but not 16 bit greyscale images.
- **polyview** for Windows 95 can read 16 bit greyscale images but no R G B images with 4 components.

7.6.1 PIXEL ASSIGNMENT TO THE 32 BIT HIPPI DATA BUS

Mode 0		Mode 1		Mode 2			
4x8Bit RGBK		3x10Bit RGB		4x16Bit RGBK			
	HIPPI-WORD, BIT#		HIPPI-WORD, BIT#	PIXEL M	HIPPI-WORD N	PIXEL M	HIPPI-WORD N+1
RED 9	31	RED 9	31	RED 15	31	BLUE 15	31
RED 8	30	RED 8	30	RED 14	30	BLUE 14	30
RED 7	29	RED 7	29	RED 13	29	BLUE 13	29
RED 6	28	RED 6	28	RED 12	28	BLUE 12	28
RED 5	27	RED 5	27	RED 11	27	BLUE 11	27
RED 4	26	RED 4	26	RED 10	26	BLUE 10	26
RED 3	25	RED 3	25	RED 9	25	BLUE 9	25
RED 2	24	RED 2	24	RED 8	24	BLUE 8	24
GREEN 9	23	RED 1	23	RED 7	23	BLUE 7	23
GREEN 8	22	RED 0	22	RED 6	22	BLUE 6	22
GREEN 7	21	GREEN 9	21	RED 5	21	BLUE 5	21
GREEN 6	20	GREEN 8	20	RED 4	20	BLUE 4	20
GREEN 5	19	GREEN 7	19	RED 3	19	BLUE 3	19
GREEN 4	18	GREEN 6	18	RED 2	18	BLUE 2	18
GREEN 3	17	GREEN 5	17	RED 1	17	BLUE 1	17
GREEN 2	16	GREEN 4	16	RED 0	16	BLUE 0	16
BLUE 9	15	GREEN 3	15	GREEN 15	15	KEY 15	15
BLUE 8	14	GREEN 2	14	GREEN 14	14	KEY 14	14
BLUE 7	13	GREEN 1	13	GREEN 13	13	KEY 13	13
BLUE 6	12	GREEN 0	12	GREEN 12	12	KEY 12	12
BLUE 5	11	BLUE 9	11	GREEN 11	11	KEY 11	11
BLUE 4	10	BLUE 8	10	GREEN 10	10	KEY 10	10
BLUE 3	9	BLUE 7	9	GREEN 9	9	KEY 9	9
BLUE 2	8	BLUE 6	8	GREEN 8	8	KEY 8	8
KEY 9	7	BLUE 5	7	GREEN 7	7	KEY 7	7
KEY 8	6	BLUE 4	6	GREEN 6	6	KEY 6	6
KEY 7	5	BLUE 3	5	GREEN 5	5	KEY 5	5
KEY 6	4	BLUE 2	4	GREEN 4	4	KEY 4	4
KEY 5	3	BLUE 1	3	GREEN 3	3	KEY 3	3
KEY 4	2	BLUE 0	2	GREEN 2	2	KEY 2	2
KEY 3	1	0	1	GREEN 1	1	KEY 1	1
KEY 2	0	0	0	GREEN 0	0	KEY 0	0

Mode 3		Mode 4		Mode 5	
3x10Bit Y-Only		2x16Bit Y-Only		3x10Bit K-Only	
3 PIXELS	HIPPI-WORD, BIT#	2 PIXELS	HIPPI-WORD, BIT#	3 PIXELS	HIPPI-WORD, BIT#
0	31	Y 15 [N+1]	31	0	31
0	30	Y 14 [N+1]	30	0	30
Y 9 [N+2]	29	Y 13 [N+1]	29	KEY 9 [N+2]	29
Y 8 [N+2]	28	Y 12 [N+1]	28	KEY 8 [N+2]	28
Y 7 [N+2]	27	Y 11 [N+1]	27	KEY 7 [N+2]	27
Y 6 [N+2]	26	Y 10 [N+1]	26	KEY 6 [N+2]	26
Y 5 [N+2]	25	Y 9 [N+1]	25	KEY 5 [N+2]	25
Y 4 [N+2]	24	Y 8 [N+1]	24	KEY 4 [N+2]	24
Y 3 [N+2]	23	Y 7 [N+1]	23	KEY 3 [N+2]	23
Y 2 [N+2]	22	Y 6 [N+1]	22	KEY 2 [N+2]	22
Y 1 [N+2]	21	Y 5 [N+1]	21	KEY 1 [N+2]	21
Y 0 [N+2]	20	Y 4 [N+1]	20	KEY 0 [N+2]	20
Y 9 [N+1]	19	Y 3 [N+1]	19	KEY 9 [N+1]	19
Y 8 [N+1]	18	Y 2 [N+1]	18	KEY 8 [N+1]	18
Y 7 [N+1]	17	Y 1 [N+1]	17	KEY 7 [N+1]	17
Y 6 [N+1]	16	Y 0 [N+1]	16	KEY 6 [N+1]	16
Y 5 [N+1]	15	Y 15 [N]	15	KEY 5 [N+1]	15
Y 4 [N+1]	14	Y 14 [N]	14	KEY 4 [N+1]	14
Y 3 [N+1]	13	Y 13 [N]	13	KEY 3 [N+1]	13
Y 2 [N+1]	12	Y 12 [N]	12	KEY 2 [N+1]	12
Y 1 [N+1]	11	Y 11 [N]	11	KEY 1 [N+1]	11
Y 0 [N+1]	10	Y 10 [N]	10	KEY 0 [N+1]	10
Y 9 [N]	9	Y 9 [N]	9	KEY 9 [N]	9
Y 8 [N]	8	Y 8 [N]	8	KEY 8 [N]	8
Y 7 [N]	7	Y 7 [N]	7	KEY 7 [N]	7
Y 6 [N]	6	Y 6 [N]	6	KEY 6 [N]	6
Y 5 [N]	5	Y 5 [N]	5	KEY 5 [N]	5
Y 4 [N]	4	Y 4 [N]	4	KEY 4 [N]	4
Y 3 [N]	3	Y 3 [N]	3	KEY 3 [N]	3
Y 2 [N]	2	Y 2 [N]	2	KEY 2 [N]	2
Y 1 [N]	1	Y 1 [N]	1	KEY 1 [N]	1
Y 0 [N]	0	Y 0 [N]	0	KEY 0 [N]	0

8. FIRST SETUP

This chapter describes startup of the Shadow Telecine, including the following sections:

- Installation check
- Power on
- Basic check of the telecine
- Control of the reference signal



Attention:

For initial installation of the Shadow Telecine, observe the order of following sections.

8.1 INSTALLATION CHECK

1. **Ventilation**

   Take care that the incoming air can circulate free.
   Details see chapter 4.5 ”Space requirements and environmental conditions”.

2. **Check internal p.c. board positions**

   Visual check only!

   Check, that all boards from Rack 1 to Rack 3 are tightly fitted in their respective sockets.

3. **Check internal connections of the telecine cabinet**

   Visual check only!

   Check, that all plugs are fitted to the correct sockets.
   If necessary, plug in loose cables into the sockets according to their label.

4. **Check external connections of the telecine**
   Check the outputs for video and audio (option), reference signals and IMCS connections as described in chapter 5 ”Connections” and chapter 3 ”System Applications”.

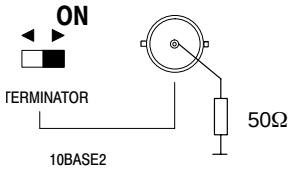
5. **Check installation of the Local Control Panel**
   Details, see chapter 4.7 “Installing Local Control Panel”

6. **Check installation of the front door handles**
   Details, see chapter 4.8

7. **Check installation of the Graphical Control Panel**
   Details, see chapter 4.9 ”Installation GCP” and the separate GCP manual
8. **Check the connections of the Micro Hub**

ATTENTION!

The internal machine communication system iMCS is based on the RJ45 interface.



10Base2 port unconnected

The TERMINATOR of the 10Base2 port of the Micro Hub must be set to “ON” - and an 50Ω terminator added - if no external device is connected!

Set TERMINATOR to “ON” -without additional 50Ω - if the port is one end of a control bus.

Set TERMINATOR to “OFF” if the control bus is connected via BNC T-connector. Details, see chapter 5.6 “iMCS connections”

9. **Check the removal of styrofoam elements**
   Details, see chapter 4.6.

10. **Check if lenses, filters and lamp (illumination path) are inserted**
    Details, see chapter 4.11 “Mounting Lenses and Filters”

11. **Check installing of Lens Gate Assembly LGA**
    Check if the appropriate Lens Gate Assembly (16 mm / 35 mm) matches the telecine unit to the respective film format.

12. **Remove possible “Effect Filter” from the LGA**
    Take care that **no** “Optical Effect Filter” is installed within the Lens Gate Assembly. For the usage of these filters, see chapter 3 in the “Operation Instructions”

13. **Connect Gateblast Air Compressor**
    See chapter 4.10 in this manual

14. **Check mains voltage**
    The voltage for operation is marked on the type label at the rear of the Telecine cabinet and should be checked against the actual mains voltage before switching on. Details see chapter 4.13 ”Mains Connection” in this manual.

THOMSON

TYPE	STE B1		
PART/SER.NO.	000 128 580 000 / 099		
POWER AC	3W+N+PE	230/400 V: 6A, 6A10A	
		120/208 V: 11A , 13A , 19A	
CE	1W+N+PE	– /200 V: 23A	
		– /230 V: 20A	
		– /240 V: 19A	
FREQUENCY	47 – 63 Hz		

N4067

This device complies with part15 of the FCC Rules. Operation is subject to the following two conditions: (1) This devise may not cause harmful interference, and (2) this device must accept any interference received,including interference that may cause undesired operation.

Fig. 801: **Type label** of Shadow telecine for 230 Mains Voltage -Europe Version at the rear side of the telecine cabinet

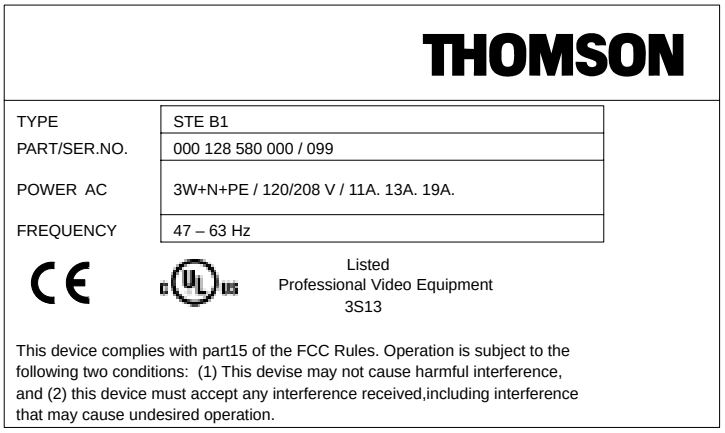


Fig. 802: **Type label** of Shadow telecine for 120 Mains Voltage - UL version - at the rear side of the telecine cabinet

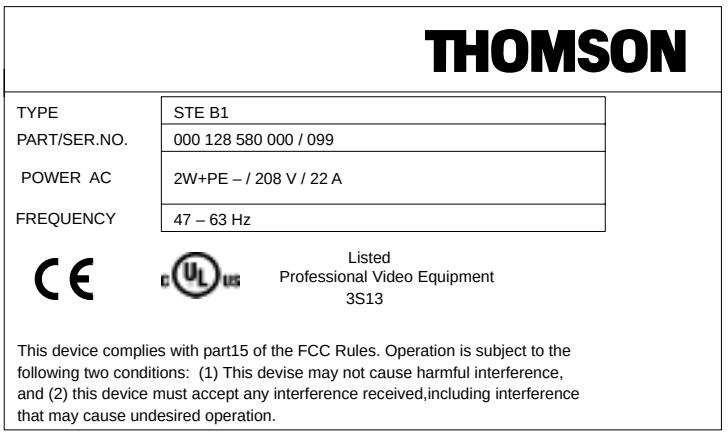
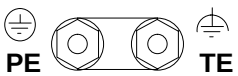


Fig. 803: **Type label** of Shadow telecine for 208 Mains Voltage - UL version - at the rear side of the telecine cabinet

15. Earthing requirements



1. Earthing with the protective earth has to be executed with the power cord which contains the earthed protective conductor **PE** (normally).
   The earth conductor has to be connected to the **PE** screw terminal within the line filter!
2. The additional protective earth has to be connected to the central **PE** screw at the power terminal unit as earth conductor with large cross section!
3. The jumper **TE –– PE** must not be broken!
4. The earth connection has to be made **before** connecting the power cord!

Additional earth conductor:

Due to its high leakage current (>3.5mA), the telecine unit **must** be connected with an additional earth conductor of 6mm^2. For more details see chapter 4.13.6 ”Required cross sections for the mains / earth cables”.
Make the earth connection with the additional earth conductor to the central **PE** screw at the power terminal unit always **before** applying mains power!

For this purpose, the line filter also carries the following warning note:



Caution !
HIGH LEAKAGE CURRENT
Earth connection essential
before connecting supply

16. Check the installation of the power cord

The-mains voltage has to be connected via a power cord to the line filter in the power terminal unit (FH 4030 / FH 4032 / FH 4033) from the rear of the telecine cabinet. For details refer to chapter 4.14 “Installation of the power cord”

8.2 POWER ON

The telecine is switched on with the "**Power switch"** at the right hand side of the unit. To switch on the Graphical Control Panel GCP1 press the power button in the upper left corner.

Note!
The boot up sequence takes about 2 minutes! Details, see the separate GCP Customer's Manual.

Warm-up

After 15 minutes operating time, all characteristics are stabilized.

To avoid EMC (electromagnetic compatibility) problems keep the rear doors always closed during operation!

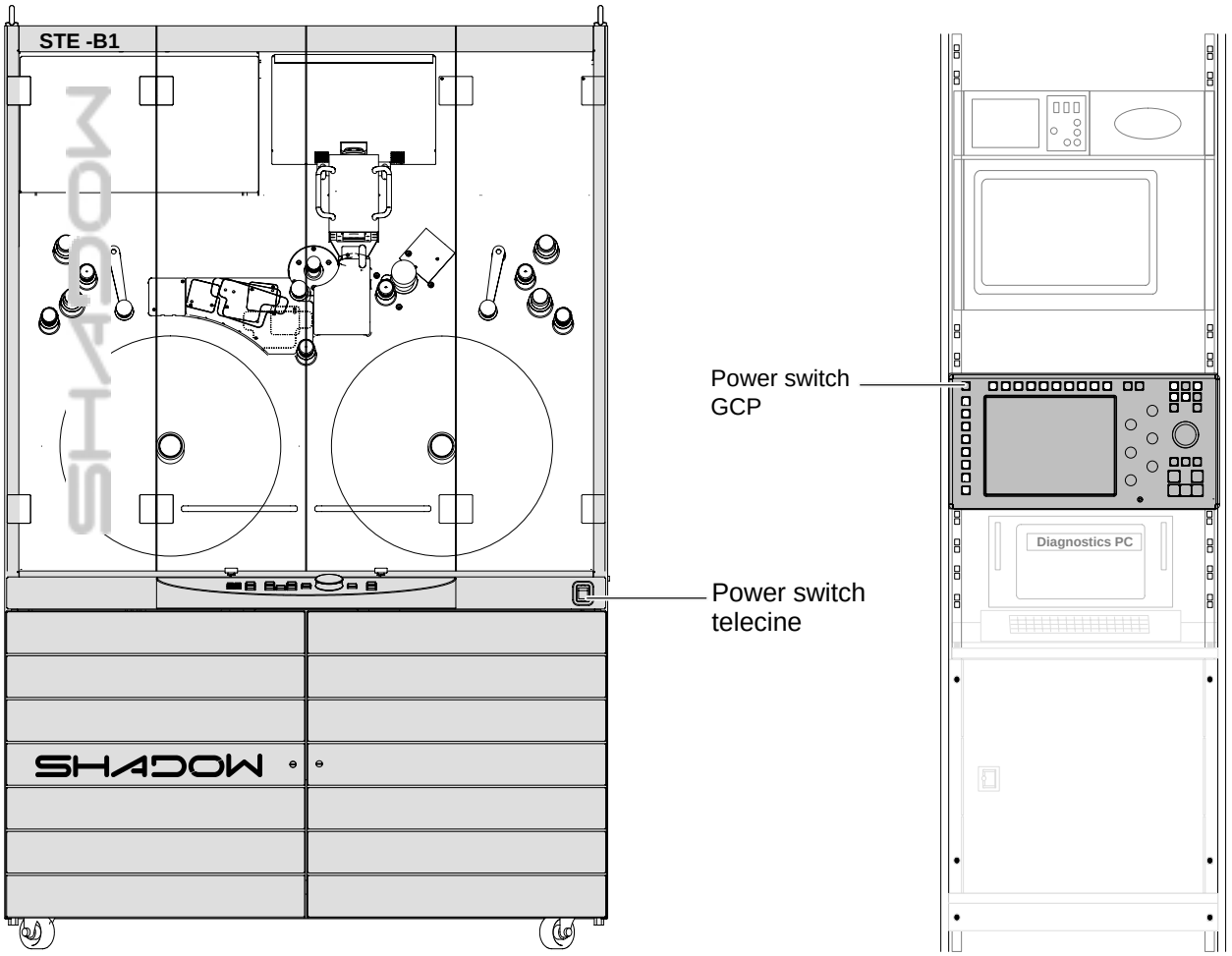


Fig. 804: Shadow Telecine and GCP

After switching on, the power up test appears on the display of the Graphical Control Panel GCP.



Press once the CONTROL BUTTON
to get control over the Shadow Telecine.

Next, the home menu appears on the display. It permits the user to handle the most important machine settings and operation modes.

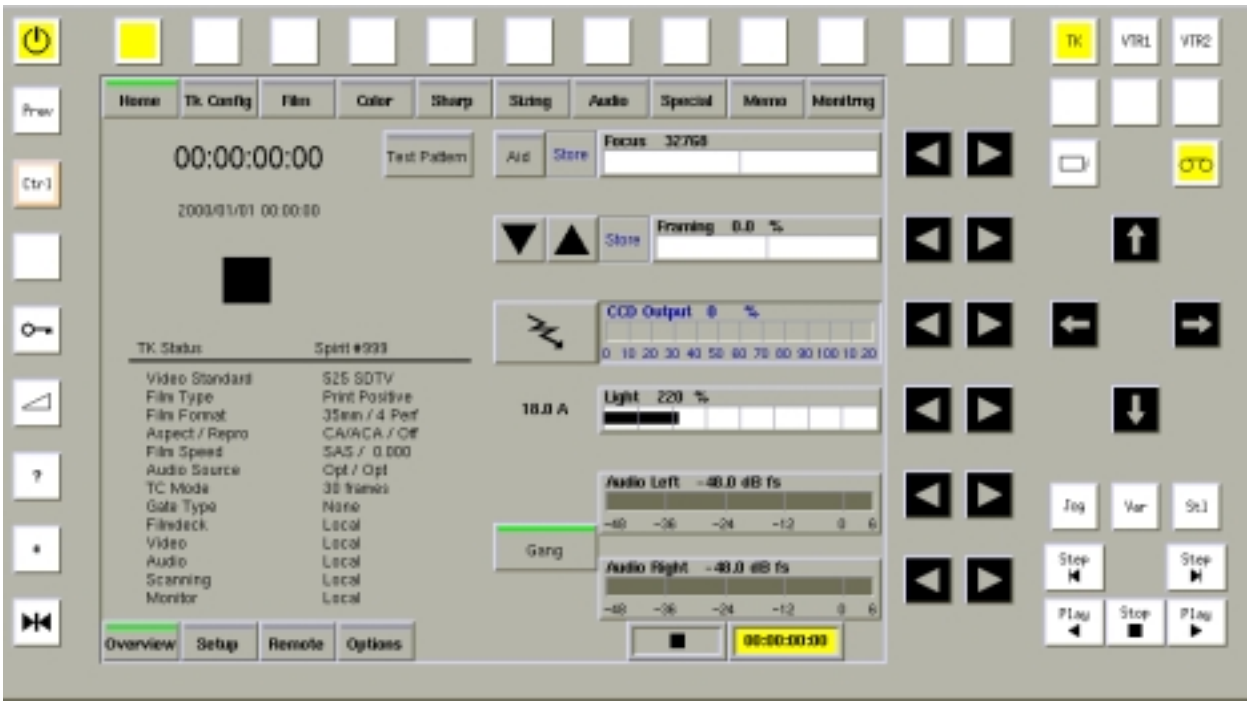


Fig. 805: Home Menu

8.3 BASIC CHECK



For the basic check Graphical Control Panel is required!
For details see chapter 3.3 of the ”Operation Instructions”.

1. **Select TV standard**
   Menu TK Config, SDTV or HDTV submenu

2. **Check Lens Gate Assembly and Film Gate Block**
   Check wether the appropriate Lens Gate Assembly (16 mm / 35 mm) and Film Gate Block match the film scanner to the respective film format.

3. **Preparation filmdeck**
   Configuration possibilities concerning filmdeck are to be found in the menu TK Config.
   Set core diameter, Auto stop, max shuttle speed

4. **Setup film**
   Menu Film, set film type
   adapt the film scanner to the film to be played.

   - **Define film type**

PRINT POS	for color or B/W positive film
PRINT NEG	for color or B/W positive film, inverted scanning
INTERM POS	for intermediate film positive
INTERM NEG	for intermediate film negative
PRIMETIME POS	for primetime neg film, non-inverted scanning
PRIMETIME NEG	for primetime negative film, inverted scanning
COLOR POS	for color negative film, non-inverted scanning
COLOR NEG	for color negative film, inverted scanning

5. **Select Ratio 4:3 / 16 : 9**
   Menu TK Config, select SDTV ratio

6. **Select speed**
   Menu TK Config, select Film speed or SAS speed
   Select a fixed or a variable film speed.

7. **Perform FPN correction**
   Local Control Panel, press both keys FPN together

8. Thread the film

- Define winding direction
  The two switches A / B on the filmdeck are to be set in position A.
- Mount film roll
  or
  Mount film reel
- Thread the film according to the film threading path, printed on the filmdeck.
- Take care to put the frame bar on the cross line of the sprocket wheel.

9. Adjust Frame Line
Menu Home, ”set frame”
or
Press key FRAMING on the Local Control Panel. This effects a coarse correction of the frame line downwards (1 perforation hole downwards per film picture).

10. Adjust optical focus
Menu Home, ”set focus”

11. Select scanning format (fixed aspect)
Menu Sizing, submenu Repro, select a fixed scan format by pressing “Fix Aspect”

12. Select fixed reproduction format (fixed repro)
Menu Sizing, submenu Repro, select fixed repro

13. Adjust Film Masking
Menu Film, submenu Masking
serves the color adaption to the actual film. Adaption is made optionally by selection of fixed (unity) or variable masking coefficients.

14. Check intensity of film illumination
Menu Film, slide the control “CCD output” for 100% video level.
The brightness of one of the RGB signals should reach a level of 100%.

15. Check Video Basic Gain
Menu Film, set GAIN to 0 dB or 6 dB
With very dense film material, use basic gain 6 dB

16. Check white level and black level (Gain & Lift)
Menu Film
Film scene white:
Adjust Gain for the white adjustment
Adjust picture white in the RGB channels to 100% video signal.
Film scene black:
Adjust “Lift” for the black adjustment.
Adjust picture black in the RGB channels to 1% setup.

17. Check black level (Black Master & Black RGB)

Note!
Adjustments of black Master and black RGB do not change the white level!
Menu Color,

Use film scene with picture black and stop

Menu Color

Black Master	RGB black level adjustment together; for adjust, slide control Black on the touch screen
Black RGB	magnitude and phase for R G B black level adjustment. slide directly on the colored hexagon of the touchscreen or use the trackball

The adjustments are judged on the color monitor.

18. Check white level (White Master & White RGB)

Adjustments of White Master and White RGB do not change the black level!

Menu Color

Film scene with picture white

White Master	RGB white level adjustment together; for adjust, slide the control White on the touch screen
White RGB	magnitude and phase RGB white level adjust individually or mixed slide directly on the colored hexagon of the touchscreen or use the the trackball

The adjustments are judged on the color monitor.

19. Check Gray level (Gamma Master & Gamma RGB)

Menu Color

Film scene with a medium gradation

Gamma Master	RGB gray level adjustment together for adjust, slide the control Gamma on the touch screen
Gamma RGB	magnitude and phase RGB gray level adjust individually or mixed slide directly on the colored hexagon of the touchscreen or use the the trackball

20. Check contour and coring

Menu Sharp

adjust contour	adjust for optimum H and V contour
adjust coring	adjust contour for optimum noise suppression in black

21. Check audio channels (if audio option is available)

Menu Audio, submenu A Config,

Select Source	Off, Ext1&2, Opt or Mag, Test tone;
Select Pre–Adjust	Source pre-adjust not necessary
Select Dolby	None or Dolby SR
select lowpass	None or 5Khz filter
Synchronize digital audio channels	int. Video or 48 Khz
Select pre-emphasis	On or Off
Select Channel mode	Mono / Stereo
Adjust lip synchronous film sound	channel 1 & 2 delay
Check film audio path with test tone	1 or 10 Khz

22. Adjust audio level

Menu Audio, submenu A level

Adjust audio level	Studio level –3dB, 0dB; 4dB; 8dB;
Adjust headphone volume	
Adjust monitoring volume	

23. Adjust Sepmag channels

Menu Special

Submenu Extern D

Sepmag Coupling Source	Bi phase or Timecode
Sepmag Coupling	2 ppf or 10 ppf

24. Using of “Optical Effect Filters” , see chapter 3 “Operation Instructions”

8.4 CONTROL OF THE REFERENCE SIGNAL

External reference signal connections on Terminal Panel FY 6319 / **Rack 3**

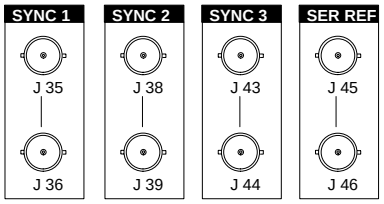


Fig. 806:

Sync 1 Loop input 1 for an analog studio reference,

SDTV: bilevel / HDTV: trilevel.

Sync 2 Loop input 2 for an analog studio reference.

SDTV: bilevel / HDTV: trilevel.

Sync 3 Loop input 3 for an analog studio reference.

SDTV: bilevel / HDTV: trilevel.

Ser Ref Loop input 3 for an analog studio reference.

Select the connected reference signal in the ”Home menu, submenu Setup” , button Genlock “Ref Sync” as a reference source.



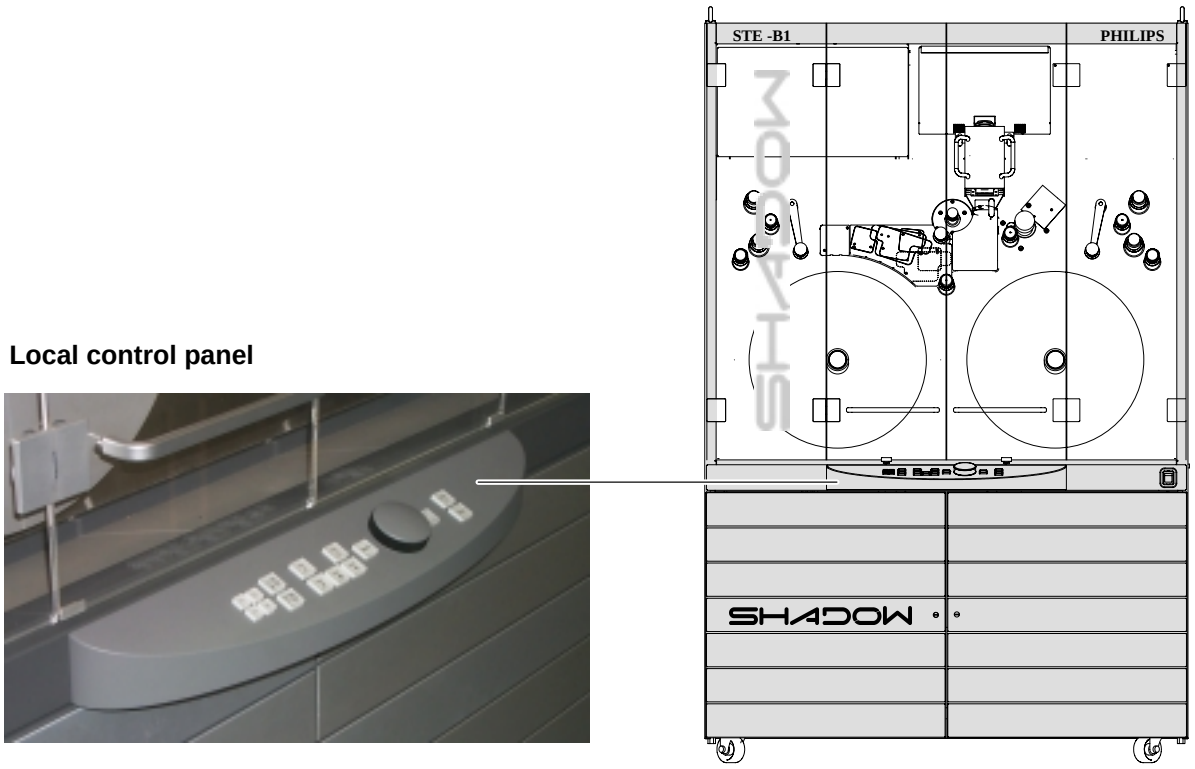
Fig. 807: Menu Setup, window Genlock Settings

The following signals can be selected from the menu:

Internal	film scanner is synchronized internally (runs free)
EXT1	film scanner is synchronized by genlock signal EXT1 (EXT 1: Input EXT REF SYNC 1 on terminal Rack 3)
EXT 2	film scanner is synchronized by genlock signal EXT 2 (EXT 2: Input EXT REF SYNC 2 on terminal Rack 3)
EXT 3	film scanner is synchronized by genlock signal EXT 3 (EXT3: Input EXT REF SYNC 3 on terminal Rack 3)
Serial	film scanner is synchronized by serial signal ”SER REF”

9. BASIC OPERATION

9.1 CONDITIONS FOR BASIC OPERATION



Local control panel

Fig. 901: Shadow Telecine

Front doors open	**Film operation up to a fixed speed of maximum 50 frames per second is possible.**
Front doors closed	**All operation modes are possible.**
Front doors locked	**With a certain shuttle speed (>2 times play) closed front doors are locked additionally. The front doors are unlocked as soon as the shuttle speed (<2 times play) is reached again.**

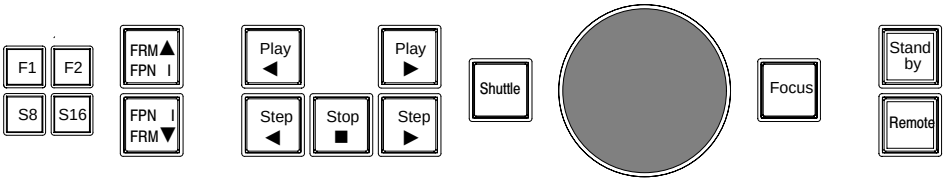
Attention!

Opening the front doors effects that a high shuttle speed is reduced to 2 times play speed!

To avoid EMC (electromagnetic compatibility) problems keep the rear doors always closed during operation!

Note:
Should it happen, that due to a technical disturbance, the electronic door lock cannot be unlocked, it is possible to manually unlock the door lock, see section 3 Servicing, chapter 3.17 in the Service Manual.

9.2 REPRODUCTION MODE (PLAY)



9.2.1 PLAY

Play mode for playback at normal speed.

Playback in this mode is started by pressing key "**Play ◀**" or "**Play ▶**" on the control panel.

9.2.2 SHUTTLE

Select Shuttle playback if you want to reach a distant film position fast (also rewind).

The film speed is set with the multi function dial in the range of maximum +/–10 times normal speed (with 35mm). The dial latches in the central position (zero film speed) and in the final position.

Shuttle playback is started by pressing key "**Shuttle**".

Note: **The maximum film speed is reduced near the end of the film.**

In high-speed shuttle playback, the video picture can serve for orientation purposes.

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